

EUR 3154.e

EUROPEAN ATOMIC ENERGY COMMUNITY - EURATOM

COMPUTER PROGRAM FOR THE CONSTRUCTION OF TABLES OF GAMMA PEAKS AND FOR CALCULATION OF SPECIFIC ACTIVITIES OF RADIOISOTOPES FORMED BY (n, γ) REACTION

by

G. GUZZI, J. PAULY, F. GIRARDI and B. DORPEMA

1966



Joint Nuclear Research Center
Ispra Establishment - Italy

Chemistry Department
and
Scientific Information Processing Center - CETIS

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SUMMARY

A computer program called LIBRAR has been developed in order to derive tables of gamma peaks classified according to their energy and to calculate the specific activities of peaks from radiosotopes produced by (n, γ) reactions. Photoelectric peaks and double escape peaks were considered. The input data include the efficiency curves of the detector, cross-sections and gamma ray abundances of the isotopes considered : for these last quantities either literature data or values determined experimentally in this laboratory have been used. The list of the program and an example of the output data are given in appendices.

INTRODUCTION.

The identification of gamma emitting isotopes obtained by neutron activation is usually done by measuring the gamma peak energies.

The ratios of the photopeak areas is also often used as a further control of the identification.

Lists of isotopes and gamma ray energies especially studied as a help for the analyst are already available (1, 2, 3, 4, 5, 6, 7, 8, 9) but the ratio of photopeak areas is generally omitted. One of the reasons is certainly the fact that the value of these ratios, depending on the detector efficiency, varies from installation to installation, and would therefore be of little general use.

We have tried to cover this gap, by setting up a computer program, called LIBRAR, to obtain with the minimum effort, a complete library of isotopes, including ratios of photopeaks valid for the detector and source geometry actually used by the experimenter, and specific activities under the peaks, expressed in counts per minute. These last figures correspond to the irradiation at saturation of one μgm of element in a thermal flux of 10^{13} neutrons/cm² sec. The decay factor is taken equal to the unity and the counting time is assumed to be 1 minute.

This program is primarily intended to help laboratories which are using Ge-Li detectors in activation analysis, although the program can be used also for scintillators. The use of Ge-Li drifted detectors in activation analysis is limited up to now by the small efficiency of the detector, although they have already been found useful applications (10, 11, 12).

The photopeak efficiency of these detectors, and

therefore the photopeak ratios, are certainly very different from that of the scintillators, and moreover dimensions and shapes, and therefore efficiencies, are constantly changing.

The program should be of help to keep the library up to date with the real detector situation of the laboratory.

INPUT DATA.

- a) Photopeak efficiency of the detector vs. gamma ray energy.

The photopeak efficiency curve of the detector vs. gamma ray energy and the efficiency for double escape peaks are the experimental input data of the program, different from one installation to the other. They must be provided in tabular form for energy increments of 50 KeV from 0 to 5,500 KeV. They are called in the program TAB1 and TAB2 and are reported on Tables I and II for the detector used in our laboratory. The efficiency curves (as shown in Figure 1 for the same detector) can be obtained by means of calibrated radioactive sources. We found especially useful for this purpose to use a sealed Th^{228} source, in equilibrium with its daughters. The advantage is the absence of decay problems and the presence in a single source of eight photopeaks useful for calibration purpose, and of energies ranging from 239 to 2,614 KeV. The radioisotopes produced by decay of Th^{228} are represented on Figure 2. The abundance of the principal gamma rays is also given. Most of these values are taken from reference 13. For some abundances however there exist discrepancies between the values from the literature and our experimental results: then the experimental abundances were reported on the Figure and indicated by an asterisk. For the double escape peaks the effi-

T A B L E I

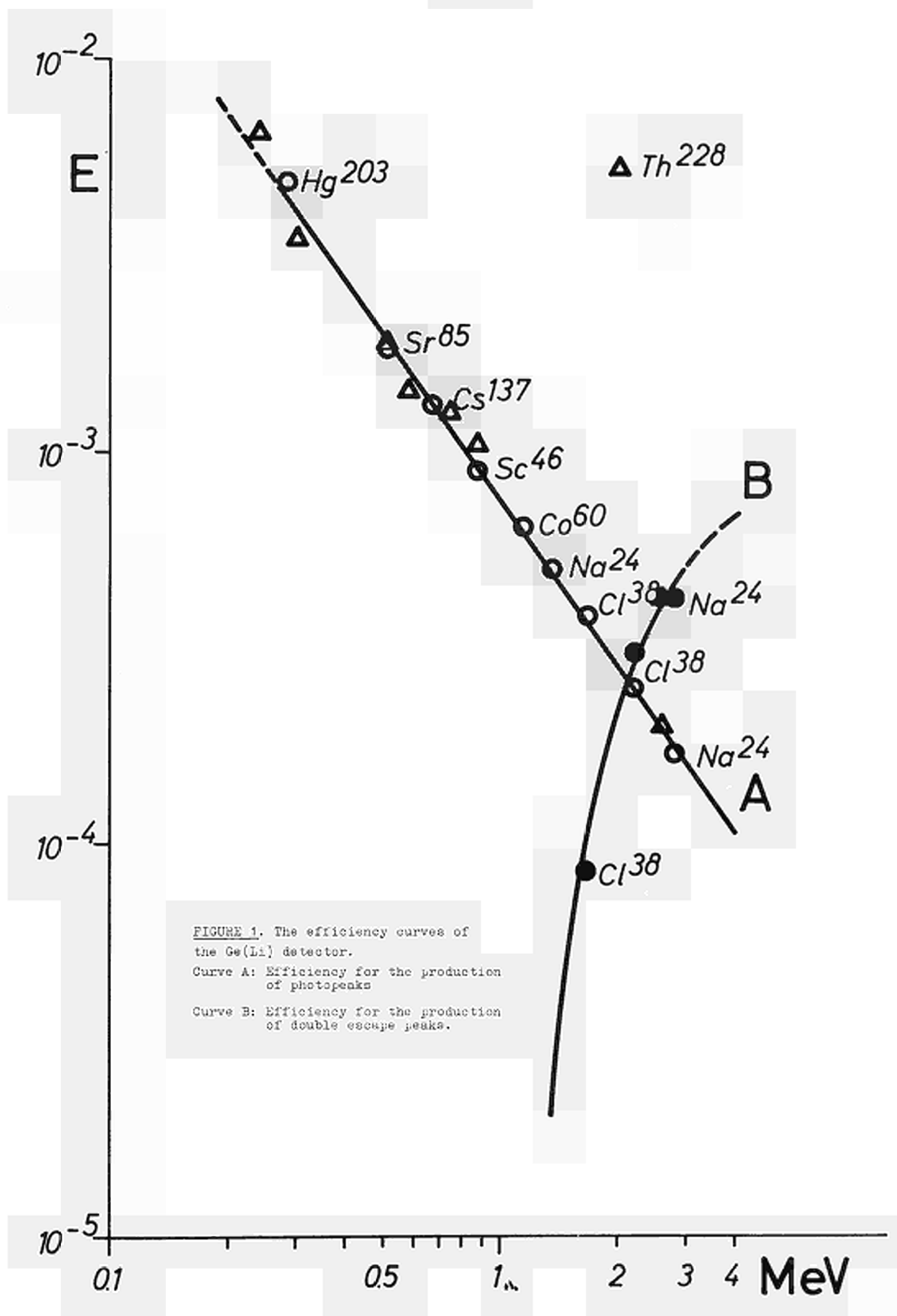
GAMMA PEAKS EFFICIENCY TABLE

| 1 | 2 | 3 | 4 | 5 |
|------------|-----------|-----------|-----------|-----------|
| 2.300E-02 | 1.700E-02 | 1.250E-02 | 7.000E-03 | 6.800E-03 |
| 5.400E-03 | 4.000E-03 | 3.000E-03 | 2.600E-03 | 2.100E-03 |
| 1.800E-03 | 1.500E-03 | 1.350E-03 | 1.200E-03 | 1.030E-03 |
| 10.000E-04 | 7.300E-04 | 8.700E-04 | 8.100E-04 | 7.600E-04 |
| 7.000E-04 | 6.200E-04 | 6.450E-04 | 6.000E-04 | 5.750E-04 |
| 5.500E-04 | 5.250E-04 | 5.000E-04 | 4.750E-04 | 4.500E-04 |
| 4.300E-04 | 4.150E-04 | 4.000E-04 | 3.800E-04 | 3.600E-04 |
| 3.450E-04 | 3.300E-04 | 3.200E-04 | 3.000E-04 | 2.900E-04 |
| 2.780E-04 | 2.630E-04 | 2.550E-04 | 2.450E-04 | 2.400E-04 |
| 2.250E-04 | 2.200E-04 | 2.160E-04 | 2.080E-04 | 2.000E-04 |
| 1.980E-04 | 1.900E-04 | 1.860E-04 | 1.800E-04 | 1.730E-04 |
| 1.720E-04 | 1.700E-04 | 1.630E-04 | 1.600E-04 | 1.590E-04 |
| 1.580E-04 | 1.570E-04 | 1.530E-04 | 1.500E-04 | 1.450E-04 |
| 1.410E-04 | 1.400E-04 | 1.370E-04 | 1.350E-04 | 1.300E-04 |
| 1.280E-04 | 1.220E-04 | 1.200E-04 | 1.130E-04 | 1.150E-04 |
| 1.120E-04 | 1.100E-04 | 1.080E-04 | 1.050E-04 | 1.020E-04 |
| 9.950E-05 | 9.600E-05 | 9.450E-05 | 9.200E-05 | 9.000E-05 |
| 8.750E-05 | 8.500E-05 | 8.350E-05 | 8.100E-05 | 8.000E-05 |
| 7.750E-05 | 7.600E-05 | 7.400E-05 | 7.200E-05 | 7.000E-05 |
| 6.900E-05 | 6.750E-05 | 6.500E-05 | 6.400E-05 | 6.250E-05 |
| 6.100E-05 | 5.950E-05 | 5.800E-05 | 5.700E-05 | 5.500E-05 |
| 5.400E-05 | 5.300E-05 | 5.200E-05 | | |

T A B L E II

DOUBLE ESCAPE PEAKS EFFICIENCY TABLE

| 1 | 2 | 3 | 4 | 5 |
|-----------|-----------|-----------|-----------|------------|
| 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 0. | 0. |
| 4.750E-07 | 9.500E-07 | 1.800E-06 | 3.000E-06 | 5.500E-06 |
| 9.000E-06 | 1.400E-05 | 2.000E-05 | 2.800E-05 | 3.800E-05 |
| 4.750E-05 | 6.000E-05 | 6.250E-05 | 8.500E-05 | 10.000E-05 |
| 1.200E-04 | 1.400E-04 | 1.600E-04 | 1.850E-04 | 2.100E-04 |
| 2.350E-04 | 2.600E-04 | 2.800E-04 | 3.080E-04 | 3.120E-04 |
| 3.450E-04 | 3.600E-04 | 3.800E-04 | 4.000E-04 | 4.250E-04 |
| 4.500E-04 | 4.600E-04 | 4.750E-04 | 5.000E-04 | 5.100E-04 |
| 5.250E-04 | 5.300E-04 | 5.500E-04 | 5.550E-04 | 5.700E-04 |
| 5.800E-04 | 6.000E-04 | 6.150E-04 | 6.200E-04 | 6.300E-04 |
| 6.450E-04 | 6.500E-04 | 6.550E-04 | 6.650E-04 | 6.700E-04 |
| 6.750E-04 | 6.800E-04 | 6.900E-04 | 6.920E-04 | 6.950E-04 |
| 7.000E-04 | 7.100E-04 | 7.200E-04 | 7.250E-04 | 7.400E-04 |
| 7.500E-04 | 7.550E-04 | 7.600E-04 | 7.750E-04 | 7.800E-04 |
| 7.950E-04 | 8.000E-04 | 8.100E-04 | 8.200E-04 | 8.250E-04 |
| 8.300E-04 | 8.450E-04 | 8.500E-04 | 8.550E-04 | 8.600E-04 |
| 8.700E-04 | 8.750E-04 | 8.800E-04 | 8.900E-04 | 9.000E-04 |
| 9.100E-04 | 9.200E-04 | 9.250E-04 | 9.400E-04 | 9.500E-04 |
| 9.600E-04 | 9.800E-04 | 9.950E-04 | | |



| RADIOISOTOPE | ENERGY kev | ABSOLUTE gamma ray abundance |
|---------------------|---------------|------------------------------------|
| Th228 | | |
| ↓ | | |
| Ra224 | 241 | 4.2 % |
| ↓ | | |
| Rn220 | | |
| ↓ | | |
| Po216 | 239 | (•) 55.0 % |
| | 300 | 4.0 % |
| ↓ | | |
| Bi212 | 727 | (•) 7.1 % |
| | 784 | |
| | others | |
| 64.2% β ↓ | | |
| Po212 | | |
| 35.8% ↓ | | |
| Tl208 | 510 | 32.0 % |
| | 583 | 88.0 % |
| | 860 | (•) 14.0 % |
| | 2614 | 100.0 % |
| ↓ | | |
| stable Pb208 | | |

(•) Experimental values

FIGURE 2. Decay Scheme of Th²²⁸

ciencies are determined from sources containing Cl^{38} and Na^{24} . The absolute activities were previously determined on a calibrated NaI(Tl) detector (14).

b) Library.

A set of data cards with the nuclear data used for the compilation of the tables are also added as library data. The first card contains the symbol of the isotope (ELEM), the numerical value of its half-life (TP) the symbol which indicates the unity used for the half-life i.e. minute, hour, day, year (T), the number of gamma peaks considered for each isotope (NE), the cross-section (SIGMA) in cm^2/g of the element and an index KD which is equal to zero, if all the values for the isotope have been taken from the literature, and is one, if the experimentally determined values have been used. Experimental data can thus be introduced instead of literature data whenever preferred, or when literature data are lacking. The successive cards introduce the energy of the gamma ray (KEV) and their abundance (A).

The values for the half-lives and the cross-sections in cm^2/g are taken from the previously published Data Handbook for Sensitivity Calculations in Neutron Activation Analysis (8), the gamma ray energies come from reference (5) and the gamma ray abundances have been taken from the book on Activation Analysis published by W.Schulze. (2). The library of nuclear data is reported on Table III.

COMPUTER PROGRAM.

A list of the program, written in Fortran IV is given in Appendix 1. First of all the input data are read, then the specific activity at saturation (AB) is calcula-

TABLE III

Library of nuclear data

| | ISOTOPE | HALF LIFE | SIGMA | ENERGY(KEV) | ABUNDANCE |
|---|---------|-----------|--------------|---|---|
| 1 | A41 | 1.80H | 8.000E-03(0) | 1290 | 9.910E-01 |
| 2 | AG110M | 260.00D | 7.300E-05(1) | 446 619 657 677 705 764 815 885 937 1324 1504 | 6.650E-02 9.500E-02 9.500E-01 1.140E-01 1.710E-01 2.370E-01 5.700E-02 7.130E-01 2.370E-01 2.600E-01 1.400E-01 |
| 3 | AL28 | 2.30M | 4.700E-03(0) | 1780 | 1.000E-00 |
| 4 | AS76 | 26.50H | 5.700E-02(1) | 561 648 1210 1410 2060 | 4.140E-01 8.300E-02 8.700E-02 8.000E-03 1.600E-02 |
| 5 | AU198 | 2.69D | 2.900E-01(0) | 412 675 1089 | 9.600E-01 1.050E-02 2.300E-03 |
| 6 | BA131 | 11.60D | 1.100E-07(0) | 124 216 239 249 374 498 620 820 920 1030 | 3.220E-01 2.410E-01 7.000E-02 8.200E-02 1.620E-01 5.780E-01 5.270E-02 3.200E-03 1.130E-02 1.770E-02 |
| 7 | BA139 | 1.42H | 1.400E-03(1) | 166 1410 | 2.300E-01 1.900E-01 |
| 8 | BR80 | 18.00M | 3.200E-02(0) | 620 | 1.375E-01 |
| 9 | BR82 | 35.90H | 1.250E-02(0) | 554 619 698 777 828 1044 1317 1475 | 7.150E-01 4.650E-01 2.850E-01 8.450E-01 2.850E-01 3.000E-01 2.750E-01 1.800E-01 |

TABLE III (continued)

| | ISOTOPE | HALF LIFE | SIGMA | ENERGY(KEV) | ABUNDANCE |
|----|---------|-----------|--------------|--|---|
| 10 | CA47 | 4.80D | 1.200E-07(0) | 480 830 1290 | 6.000E-02 6.000E-02 7.700E-01 |
| 11 | CA47 | 9.80M | 1.000E-05(0) | 3100 4050 4680 | 9.900E-01 1.040E-01 6.000E-03 |
| 12 | CD111M | 6.70H | 1.300E-04(0) | 150 246 | 2.800E-01 9.400E-01 |
| 13 | CD115 | 55.00H | 1.700E-05(0) | 230 260 263 490 520 | 5.650E-03 1.700E-03 1.750E-03 1.350E-01 2.640E-01 |
| 14 | IN115M | 4.50H | 1.700E-03(0) | 335 | 3.660E-01 |
| 15 | CE141 | 72.00D | 1.200E-05(0) | 142 | 5.720E-01 |
| 16 | CE143 | 33.00H | 4.500E-04(0) | 232 234 234 351 493 668 722 | 4.500E-02 3.900E-01 9.800E-03 4.950E-02 9.200E-02 8.900E-01 |
| 17 | CL33 | 37.50M | 1.550E-07(1) | 1590 2164 | 3.600E-01 4.250E-01 |
| 18 | CO60 | 5.25Y | 3.700E-01(0) | 1172 1332 | 1.000E-00 1.000E-00 |
| 19 | CR51 | 27.90D | 1.900E-07(1) | 325 | 9.900E-02 |
| 20 | CS134M | 3.20H | 1.400E-02(0) | 127 137 | 4.000E-02 4.000E-02 |
| 21 | CS134 | 2.20Y | 1.300E-01(0) | 475 563 569 605 705 705 1033 1033 1168 1368 | 1.500E-02 9.300E-02 1.420E-01 9.750E-01 9.720E-01 9.800E-02 1.030E-02 1.240E-02 3.370E-02 |
| 22 | CU64 | 12.80H | 2.720E-02(1) | 511 1340 | 3.200E-01 5.000E-03 |
| 23 | CU66 | 5.10M | 5.250E-03(0) | 830 1040 | 2.000E-03 9.200E-02 |
| 24 | DY165 | 2.32H | 2.900E-00(0) | 94 272 355 | 6.250E-02 7.200E-03 1.440E-02 |
| 25 | ER171 | 7.50H | 4.800E-03(0) | 112 117 124 206 208 | 1.820E-01 1.400E-02 7.000E-02 1.820E-01 5.250E-01 |
| 26 | EU152M | 9.20H | 2.650E-03(0) | 122 244 244 277 261 283 327 1327 1410 | 6.920E-02 2.450E-02 1.020E-01 1.045E-01 9.300E-03 2.450E-02 1.820E-02 |
| 27 | EU152 | 12.50Y | 1.250E-01(0) | 121 245 244 412 782 782 872 969 1020 1200 1420 | 2.800E-01 1.190E-01 2.610E-01 0.000E-03 1.040E-01 4.440E-02 1.790E-01 1.490E-01 5.940E-02 2.690E-01 |
| 28 | EU154 | 16.00Y | 2.100E-01(0) | 127 248 248 593 594 706 725 759 875 998 1007 1277 | 3.440E-01 8.150E-02 4.000E-02 5.000E-03 5.000E-03 2.100E-01 7.030E-02 1.300E-01 1.400E-01 1.700E-01 4.200E-01 |

TABLE III (continued)

| | ISOTOPE | HALF LIFE | SIGMA | ENERGY(KEV) | ABUNDANCE |
|----|---------|-----------|--------------|--|--|
| 29 | FE59 | 45.00D | 3.400E-05(0) | 145 191 1028 1289 | 0.000E-03 2.790E-02 5.700E-01 4.500E-01 |
| 30 | GA72 | 14.20H | 1.500E-02(1) | 601 630 834 894 1050 1525 1959 2063 2491 2508 | 7.170E-02 2.353E-01 7.340E-01 3.190E-02 5.100E-02 1.022E-01 5.280E-02 2.870E-01 3.030E-02 1.678E-01 |
| 31 | GD159 | 13.00H | 3.800E-03(0) | 220 300 364 | 4.700E-03 9.480E-04 1.880E-01 |
| 32 | GE75 | 1.33H | 1.350E-03(0) | 199 264 427 477 628 | 1.540E-02 1.290E-01 3.200E-02 3.000E-03 2.300E-03 |
| 33 | GE77 | 12.00H | 1.300E-04(0) | 210 215 265 368 416 563 633 706 920 1080 1370 | 2.343E-01 2.520E-01 5.510E-01 1.680E-01 2.715E-01 1.521E-01 1.131E-01 1.014E-01 6.420E-02 7.320E-02 7.050E-02 |
| 34 | HF175 | 70.00D | 2.620E-05(0) | 114 220 343 430 | 2.260E-02 6.320E-02 3.200E-01 1.390E-02 |
| 35 | HF180M | 5.50H | 3.000E-02(0) | 016 332 443 501 | 7.300E-01 9.390E-01 7.220E-01 1.890E-01 |
| 36 | HF181 | 45.00D | 1.300E-02(1) | 133 136 177 246 482 516 | 4.120E-01 5.900E-02 1.800E-02 1.360E-01 8.400E-01 1.985E-01 |
| 37 | HG197M | 24.00H | 1.900E-03(0) | 173 164 | 3.590E-01 5.820E-02 |
| 38 | HG197 | 3.70D | 5.700E-03(0) | 192 | 5.860E-02 |
| 39 | HG203 | 46.50D | 3.400E-03(0) | 272 | 9.250E-01 |
| 40 | HO166 | 27.30H | 2.200E-01(0) | 80 1360 1520 1610 | 8.370E-02 9.870E-03 1.970E-03 9.900E-04 |
| 41 | I128 | 25.00M | 2.600E-02(0) | 450 540 750 990 | 1.760E-01 1.790E-02 2.000E-03 3.000E-03 |
| 42 | IN114M | 42.00D | 1.200E-02(0) | 122 556 722 1299 | 1.350E-01 3.500E-02 3.500E-02 0.000E-04 |
| 43 | IN116M | 54.00M | 7.800E-01(0) | 137 406 1085 1274 1437 2090 | 2.310E-02 2.460E-01 5.400E-01 7.500E-01 2.100E-01 2.500E-01 |
| 44 | IR192 | 74.00D | 1.200E-00(0) | 201 206 233 266 302 317 375 417 468 485 589 605 613 885 | 2.750E-03 2.320E-02 3.940E-03 2.730E-01 2.700E-01 7.200E-01 1.120E-02 1.235E-02 4.930E-01 2.540E-02 5.470E-02 1.080E-01 6.450E-02 3.860E-03 |

TABLE III (continued)

| | ISOTOPE | HALF LIFE | SIGMA | ENERGY (KEV) | ABUNDANCE |
|----|---------|-----------|--------------|--|--|
| 45 | IR194 | 19.00H | 2.500E-01(0) | 222 232 633 643 937 1150 1479 | 4.000E-02 2.500E-01 1.600E-02 5.700E-02 2.760E-02 3.790E-02 1.700E-02 |
| 46 | K42 | 12.50H | 1.400E-03(0) | 1530 | 1.700E-01 |
| 47 | LA140 | 40.20H | 7.600E-02(0) | 329 439 497 815 1600 2500 | 3.800E-01 5.950E-02 4.900E-01 4.540E-01 9.900E-01 9.000E-02 |
| 48 | LU177 | 6.80D | 7.600E-01(0) | 113 208 250 371 | 3.120E-02 6.200E-02 3.900E-02 3.070E-02 |
| 49 | MG27 | 9.50M | 1.400E-04(0) | 172 243 1015 | 7.000E-02 7.000E-01 2.200E-01 |
| 50 | MN56 | 2.60H | 1.310E-01(1) | 845 1206 1311 2451 2976 | 2.750E-01 2.240E-01 1.070E-01 1.000E-01 4.000E-01 |
| 51 | MO99 | 66.00H | 7.900E-04(0) | 140 121 172 240 250 | 1.250E-02 6.400E-02 7.300E-02 7.500E-02 7.500E-02 |
| 52 | MO101 | 14.60M | 1.200E-04(0) | 170 123 192 252 267 345 240 | 2.120E-02 3.230E-02 2.000E-01 2.120E-02 3.230E-01 2.120E-01 7.000E-01 |
| 53 | NA24 | 15.00H | 1.170E-02(1) | 1268 2734 | 1.000E-02 1.000E-02 |
| 54 | NB24M | 6.60M | 6.500E-03(0) | 274 | 9.100E-04 |
| 55 | ND147 | 11.50D | 1.000E-03(0) | 121 277 321 412 441 533 600 633 | 5.700E-02 1.730E-02 2.350E-02 1.240E-02 1.760E-02 1.150E-01 4.000E-02 7.000E-02 |
| 56 | NI65 | 2.60H | 1.470E-04(1) | 363 1114 1422 | 3.620E-02 1.220E-01 2.150E-01 |
| 57 | OS191 | 16.00D | 6.700E-03(0) | 122 | 2.440E-01 |
| 58 | OS193 | 32.00H | 2.100E-02(0) | 132 281 371 283 460 | 3.240E-02 4.200E-02 2.450E-02 5.080E-02 2.170E-01 |
| 59 | PR142 | 19.20H | 4.600E-02(0) | 1370 | 4.000E-02 |
| 60 | PT197 | 13.00H | 6.800E-04(0) | 121 279 | 1.720E-02 9.750E-03 |
| 61 | PT199 | 30.00M | 9.700E-04(0) | 197 246 312 475 540 720 770 960 | 1.350E-02 8.200E-02 2.160E-01 3.110E-01 5.750E-01 1.700E-01 1.700E-02 4.000E-02 |
| 62 | AU199 | 3.20D | 9.700E-04(0) | 158 258 | 6.600E-01 1.320E-01 |
| 63 | RB86 | 17.00D | 2.380E-03(1) | 1079 | 9.950E-02 |

TABLE III (continued)

| | ISOTOPE | HALF LIFE | SIGMA | ENERGY (KEV) | ABUNDANCE |
|----|---------|-----------|--------------|---|---|
| 64 | RU88 | 17.8CM | 2.400E-04(0) | 208 1390 1850 2110 2680 3010 3240 4970 | 1.338E-01 1.750E-02 2.918E-01 1.310E-02 3.210E-02 4.100E-03 4.100E-03 4.100E-03 |
| 65 | RE186 | 3.8CD | 1.450E-01(0) | 127 137 631 768 | 9.000E-03 1.020E-01 6.700E-04 3.980E-04 |
| 66 | RE188 | 17.0CM | 1.400E-01(0) | 155 478 673 | 9.000E-02 6.000E-03 0.000E-03 |
| 67 | RU97 | 2.2CD | 7.100E-05(0) | 109 216 305 | 1.130E-02 7.570E-01 5.450E-02 |
| 68 | RU103 | 40.0CD | 2.700E-03(0) | 440 498 560 610 | 5.000E-03 9.000E-01 4.800E-03 5.940E-02 |
| 69 | RU105 | 4.5CM | 7.600E-04(0) | 130 726 | 2.500E-01 9.795E-01 |
| 70 | S37 | 5.04M | 4.500E-07(0) | 3100 | 9.000E-01 |
| 71 | SB122 | 2.8CD | 2.000E-02(0) | 564 625 1140 1260 | 6.600E-01 3.280E-02 3.000E-02 7.000E-02 |
| 72 | SB124 | 69.0CD | 5.700E-03(0) | 603 646 714 723 770 1322 1694 2020 | 9.200E-01 9.500E-02 1.520E-01 5.500E-01 4.300E-02 7.900E-02 4.470E-01 3.500E-02 |
| 73 | SC46 | 24.0CD | 3.000E-01(0) | 885 1110 | 1.000E-00 1.000E-00 |
| 74 | SE75 | 120.0CD | 1.700E-03(0) | 121 156 200 265 320 313 402 | 1.540E-01 5.160E-01 1.650E-02 5.550E-01 2.550E-01 1.070E-02 1.320E-01 |
| 75 | SE81M | 26.0CM | 1.150E-01(0) | 103 | 8.100E-02 |
| 76 | SI31 | 2.6CM | 7.200E-05(0) | 1260 | 7.000E-04 |
| 77 | SM153 | 47.0CD | 1.500E-01(0) | 103 170 342 615 | 3.300E-01 2.000E-04 6.500E-03 0.000E-05 |
| 78 | SN113 | 120.0CD | 6.500E-05(0) | 360 392 | 2.000E-02 6.950E-01 |
| 79 | SN117M | 14.0CD | 5.660E-06(1) | 159 | 9.500E-01 |
| 80 | SN123 | 40.0CM | 3.850E-05(0) | 153 | 8.200E-01 |
| 81 | SN125M | 2.5CM | 6.050E-05(0) | 326 640 1070 1394 | 9.570E-01 3.000E-03 3.000E-03 1.700E-02 |
| 82 | SR25 | 65.0CD | 5.300E-05(0) | 513 | 9.920E-01 |
| 83 | SR87M | 2.8CM | 1.100E-03(0) | 388 | 7.300E-01 |
| 84 | TA182M | 16.5CM | 0.000E-05(0) | 180 | 1.900E-01 |
| 85 | TA182 | 115.0CD | 6.300E-02(0) | 100 114 152 179 222 1122 1139 1222 1231 | 1.330E-02 2.920E-02 1.180E-01 5.400E-02 1.190E-01 3.380E-01 1.510E-01 3.200E-01 1.680E-01 |

TABLE III (continued)

| | ISOTOPE | HALF LIFE | SIGMA | ENERGY(KEV) | ABUNDANCE |
|-----|---------|-----------|---------------|--|---|
| 86 | TB160 | 75.00D | 3.0000E-02(0) | 127 222 321 620 264 1123 1270 | 1.120E-01 3.300E-01 3.300E-02 3.300E-01 3.500E-01 1.600E-01 8.000E-02 |
| 87 | II131 | 8.10D | 3.600E-04(0) | 224 364 637 722 | 5.150E-02 8.200E-01 9.250E-02 2.790E-02 |
| 88 | PA233 | 27.00D | 2.000E-02(0) | 301 313 341 400 | 6.820E-02 4.650E-01 1.890E-02 2.000E-02 |
| 89 | TI151 | 5.80M | 2.400E-05(0) | 323 605 928 | 9.580E-01 1.400E-02 4.200E-01 |
| 90 | NP239 | 2.75D | 7.000E-03(0) | 106 323 278 | 3.950E-01 2.240E-01 2.850E-01 |
| 91 | V52 | 3.75M | 5.300E-02(0) | 1440 | 1.000E-02 |
| 92 | W187 | 24.00H | 3.200E-02(0) | 174 429 552 612 626 774 266 | 1.020E-01 2.040E-01 8.250E-02 5.150E-02 3.860E-01 4.100E-02 2.400E-02 |
| 93 | YB169 | 22.00D | 5.350E-02(0) | 110 112 131 177 177 261 202 | 1.700E-01 1.700E-02 9.250E-03 2.040E-02 3.740E-01 5.250E-02 1.190E-01 |
| 94 | YB175 | 4.20D | 6.600E-02(0) | 114 172 185 251 233 226 | 2.770E-02 1.240E-02 5.300E-02 3.420E-02 5.550E-02 8.250E-02 |
| 95 | YB177 | 1.90H | 2.400E-03(0) | 113 140 147 950 1090 1120 1240 | 3.500E-03 2.700E-03 6.320E-02 3.200E-03 1.620E-02 2.200E-03 1.460E-02 |
| 96 | ZN65 | 245.00D | 8.450E-04(1) | 511 1114 | 3.000E-02 4.400E-01 |
| 97 | ZN69M | 13.80H | 1.700E-04(0) | 438 | 9.470E-01 |
| 98 | ZR95 | 65.00D | 5.700E-05(0) | 722 754 | 4.900E-01 4.900E-01 |
| 99 | NB95 | 27.00D | 3.700E-05(0) | 765 | 9.920E-01 |
| 100 | ZR97 | 17.00H | 2.800E-06(0) | 665 747 1350 1620 2200 | 9.985E-01 9.850E-01 4.000E-02 2.000E-02 0.000E-02 |

ted for the photopeaks. Therefore the cross-section (SIGMA) of each element is multiplied by the abundance (A) of the gamma ray considered and by the values of the detector efficiency derived by interpolation from the TAB1 array. A constant factor equal to $60 \times 10^{13} / 10^6 = 6 \times 10^8$ is introduced to reduce the specific activity at saturation to more convenient experimental conditions: a counting time of 1 minute, a thermal flux of 10^{13} neutrons/cm² sec and a weight of 1 microgram.

For the gamma ray having an energy larger than 1,022 KeV the double escape peak energy is derived and the specific activity computed by applying the same procedure with the TAB2 array. An index KP is added to the value of the specific activity. Index (2) means that the peak is a photoelectric peak; index (3) means that it is a double escape peak.

The different gamma peak are then classified according to their energy. The results in the order of increasing energies are given on Table IV which will be discussed in the next section.

OUTPUT DATA.

On Table IV the gamma peaks of 100 radioisotopes are reported in order of gamma ray energy. The energy in KeV is given in the first column. Peaks with energy lower than 100 KeV were omitted as the adsorption within the detector chamber can introduce a large discrepancy between the theoretical and the experimental values. Moreover the presence of a high number of elements with low energy peaks makes the interpretation of the low energy region of the gamma spectrum very hard or even illusory in

TABLE IV

Gamma Peaks in order of increasing energies

| | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY |
|---|---------|-----------|--|--|
| 1 | A41 | 1.8CH | 1290 | 0.2521E 04 |
| 2 | AG110M | 260.00D | 446 619 657 677 705 764 815 885 937 1384 1504 482 | 0.6237E 03 0.5380E 03 0.4235E 04 0.5663E 03 0.3029E 03 0.1018E 04 0.2177E 03 0.2586E 04 0.8024E 03 0.5500E 03 0.2629E 03 0.2974E 02 |
| 3 | AL28 | 2.8CH | 1790 758 | 0.9475E 03 0.3722E 03 |
| 4 | AS76 | 26.5CH | 561 642 1210 1410 2060 1038 | 0.1343E 05 0.2222E 04 0.1101E 04 0.3547E 02 0.9235E 02 0.2377E 02 |
| 5 | AU198 | 2.69D | 412 675 1089 | 0.4143E 06 0.2033E 04 0.2612E 03 |
| 6 | BA131 | 11.6CD | 124 216 239 249 374 498 620 820 920 1030 | 0.2092E-00 0.1010E-00 0.2637E-01 0.2938E-01 0.3114E-01 0.6212E-01 0.4437E-02 0.1913E-03 0.5322E-03 0.8057E-03 |
| 7 | BA139 | 1.42H | 166 1410 | 0.1603E 04 0.7501E 02 |
| 8 | BR80 | 18.0CM | 620 | 0.3406E 04 |
| 9 | BR82 | 35.9CH | 554 619 698 777 828 1044 1317 1475 453 | 0.7979E 04 0.4509E 04 0.2319E 04 0.6098E 04 0.1916E 04 0.1535E 04 0.1065E 04 0.5940E 03 0.5771E 02 |

TABLE IV (continued)

| ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY |
|---------|-----------|-----------------|----------------------|
| 10 | CA47 | 4.80D | 480 |
| | | 330 | 0.8294E-02 |
| | | 1290 | 0.3362E-02 |
| 11 | CA49 | 8.80M | 0.2938E-01 |
| | | 3100 | 0.2451E 01 |
| | | 4050 | 0.1727E-00 |
| | | 4630 | 0.7045E-02 |
| | | 2078 | 0.9852E-01 |
| | | 3028 | 0.1413E-01 |
| 12 | CD111M | 6.70H | 0.9266E-01 |
| | | 3658 | 0.1966E 03 |
| 13 | CD115 | 55.00H | 0.4041E 03 |
| | | 150 | 0.3435E 02 |
| 14 | IN115M | 4.50H | 0.8273E 05 |
| | | 246 | 0.3939E 01 |
| | | 263 | 0.2561E 03 |
| | | 490 | 0.4524E 03 |
| | | 520 | 0.1234E 04 |
| 15 | CE141 | 32.00D | 0.4123E 04 |
| | | 142 | 0.7173E 02 |
| | | 232 | 0.4332E 03 |
| | | 294 | 0.3435E 01 |
| | | 351 | 0.2462E 03 |
| 16 | CE143 | 33.00H | 0.2780E 02 |
| | | 493 | 0.2511E 03 |
| | | 668 | 0.1749E 03 |
| | | 722 | 0.2628E 03 |
| | | 1142 | 0.2176E 02 |
| 17 | CL38 | 37.50 I | 0.1730E 06 |
| | | 1590 | 0.1130E 06 |
| | | 2164 | 0.1730E 04 |
| | | 563 | 0.1730E 04 |
| 18 | CO60 | 5.25Y | 0.1730E 04 |
| | | 1172 | 0.3165E 04 |
| 19 | CR51 | 27.80D | 0.3165E 01 |
| | | 325 | 0.2031E 04 |
| 20 | CS134M | 3.20H | 0.9450E 04 |
| | | 127 | 0.1593E 05 |
| | | 137 | 0.1017E 06 |
| | | 569 | 0.6407E 05 |
| | | 605 | 0.6375E 04 |
| 21 | CS134 | 2.20Y | 0.5303E 03 |
| | | 736 | 0.2821E 03 |
| | | 801 | 0.1291E 04 |
| | | 1039 | 0.1073E 05 |
| | | 1168 | 0.1073E 05 |
| | | 1368 | 0.1073E 05 |
| 22 | CU64 | 12.80H | 0.1073E 05 |
| | | 511 | 0.4121E 02 |
| 23 | CU66 | 5.10M | 0.5032E 01 |
| | | 1340 | 0.1932E 03 |
| 24 | DY165 | 2.32H | 0.1413E 07 |
| | | 94 | 0.5748E 05 |
| | | 179 | 0.7268E 05 |
| 25 | ER171 | 7.50H | 0.6113E 04 |
| | | 112 | 0.4560E 03 |
| | | 117 | 0.2131E 04 |
| | | 124 | 0.2026E 04 |
| | | 286 | 0.6175E 04 |
| 26 | EU152M | 2.70H | 0.1016E 07 |
| | | 122 | 0.1034E 04 |
| | | 344 | 0.1036E 06 |
| | | 357 | 0.1041E 06 |
| | | 261 | 0.1123E 05 |
| | | 283 | 0.1093E 05 |
| 27 | EU152 | 12.50Y | 0.1760E 05 |
| | | 1727 | 0.7516E 09 |
| | | 1410 | 0.4941E 07 |
| | | 121 | 0.6452E 07 |
| | | 245 | 0.1760E 06 |
| | | 344 | 0.7451E 06 |
| | | 412 | 0.2322E 06 |
| | | 793 | 0.8167E 06 |
| | | 973 | 0.7238E 06 |
| | | 969 | 0.2562E 06 |
| 28 | EU154 | 16.00Y | 0.9331E 06 |
| | | 1090 | 0.2045E 07 |
| | | 1200 | 0.2028E 06 |
| | | 1420 | 0.2024E 05 |
| | | 123 | 0.2033E 04 |
| | | 269 | 0.2033E 04 |
| | | 523 | 0.1112E 06 |
| | | 694 | 0.3720E 05 |
| | | 706 | 0.5062E 05 |
| | | 725 | 0.5369E 05 |
| 29 | FE59 | 45.00D | 0.6471E 05 |
| | | 753 | 0.1230E 06 |
| | | 875 | 0.1207E 01 |
| | | 993 | 0.4096E 01 |
| | | 1007 | 0.7516E 01 |
| 29 | FE59 | 45.00D | 0.4654E 01 |
| | | 1277 | 0.4654E 01 |

TABLE IV (continued)

| ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY |
|---------|-----------|-----------------|----------------------|
| 30 | GA72 | 14.20H | 601 0.8622E 03 |
| | | | 630 0.2668E 04 |
| | | | 334 0.6034E 04 |
| | | | 394 0.6533E 03 |
| | | | 1050 0.3244E 03 |
| | | | 1525 0.3218E 03 |
| | | | 1950 0.1769E 03 |
| | | | 2203 0.6176E 03 |
| | | | 2491 0.1585E 03 |
| | | | 2508 0.2271E 03 |
| | | | 573 0.5765E 02 |
| | | | 777 0.1019E 03 |
| | | | 1181 0.3110E 03 |
| | | | 1469 0.3560E 03 |
| | | | 1436 0.6320E 03 |
| 31 | GD159 | 18.00H | 220 0.6687E 02 |
| | | | 300 0.8646E 01 |
| | | | 364 0.1300E 04 |
| 32 | GE75 | 1.33H | 199 0.3537E 02 |
| | | | 264 0.5213E 03 |
| | | | 427 0.6239E 01 |
| | | | 477 0.4709E 01 |
| 33 | GE77 | 12.00H | 628 0.2359E 01 |
| | | | 210 0.1122E 03 |
| | | | 215 0.1254E 03 |
| | | | 265 0.2140E 03 |
| | | | 368 0.3210E 02 |
| | | | 416 0.5167E 02 |
| | | | 563 0.1733E 02 |
| | | | 632 0.1104E 02 |
| | | | 709 0.3423E 01 |
| | | | 920 0.3256E 01 |
| | | | 1080 0.4020E 01 |
| | | | 1370 0.2695E 01 |
| 34 | HF175 | 70.00D | 114 0.1968E 03 |
| | | | 230 0.2071E 04 |
| | | | 343 0.1644E 03 |
| | | | 430 0.1345E 03 |
| 35 | HF180M | 5.50H | 216 0.8218E 05 |
| | | | 332 0.5825E 05 |
| | | | 443 0.3054E 05 |
| | | | 501 0.6103E 04 |
| 36 | HF181 | 45.00D | 133 0.3330E 05 |
| | | | 136 0.4593E 04 |
| | | | 137 0.1321E 04 |
| | | | 346 0.3462E 04 |
| | | | 432 0.1250E 05 |
| | | | 616 0.2016E 04 |
| 37 | HG197M | 24.00H | 133 0.4170E 04 |
| | | | 164 0.5563E 03 |
| 38 | HG197 | 2.70D | 192 0.1433E 03 |
| 39 | HG203 | 46.50D | 279 0.7722E 04 |
| 40 | H0166 | 27.30H | 90 0.1580E 06 |
| | | | 1360 0.6449E 03 |
| | | | 1530 0.1025E 03 |
| | | | 1610 0.5175E 02 |
| | | | 508 0.1430E 02 |
| | | | 588 0.3756E 01 |
| 41 | I128 | 25.00M | 450 0.5766E 04 |
| | | | 540 0.4356E 03 |
| | | | 750 0.3120E 02 |
| | | | 990 0.3332E 02 |
| 42 | IN114M | 42.00D | 122 0.2526E 04 |
| | | | 556 0.3735E 03 |
| | | | 722 0.2633E 03 |
| | | | 1209 0.3784E 01 |
| 43 | IN116M | 54.00M | 137 0.1071E 06 |
| | | | 406 0.2224E 06 |
| | | | 1035 0.1657E 06 |
| | | | 1274 0.1338E 06 |
| | | | 1487 0.4277E 05 |
| | | | 2090 0.3002E 05 |
| | | | 465 0.4426E 04 |
| | | | 1068 0.3229E 05 |
| | | | 201 0.1341E 05 |
| | | | 206 0.1108E 06 |
| | | | 243 0.1270E 05 |
| 44 | IR192 | 74.00D | 296 0.8083E 06 |
| | | | 302 0.7496E 06 |
| | | | 317 0.1233E 07 |
| | | | 375 0.2339E 05 |
| | | | 417 0.2161E 05 |
| | | | 468 0.7071E 06 |
| | | | 485 0.3456E 05 |
| | | | 588 0.5458E 05 |
| | | | 605 0.1039E 06 |
| | | | 613 0.6088E 05 |
| | | | 885 0.2301E 04 |

TABLE IV (continued)

| ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY |
|---------|-----------|-----------------|----------------------|
| 45 | IR194 | 12.0CH | 0.3021E 05 |
| | | | 0.1574E 06 |
| | | | 0.3135E 04 |
| | | | 0.1048E 05 |
| | | | 0.3335E 04 |
| | | | 0.2511E 04 |
| | | | 0.1251E 03 |
| 46 | K42 | 12.5CH | 0.6366E 02 |
| | | | 0.3316E 01 |
| 47 | LA140 | 40.2CH | 0.2218E 05 |
| | | | 0.2553E 04 |
| | | | 0.1988E 05 |
| | | | 0.3943E 04 |
| | | | 0.3754E 04 |
| | | | 0.3842E 02 |
| | | | 0.1336E 04 |
| 48 | LU177 | 6.8CH | 0.7311E 05 |
| | | | 0.9301E 05 |
| | | | 0.1338E 05 |
| | | | 0.5557E 04 |
| | | | |
| | | | |
| | | | |
| 49 | MG27 | 9.5CH | 0.4723E 01 |
| | | | 0.5165E 02 |
| | | | 0.1703E 02 |
| 50 | M456 | 2.6CH | 0.6734E 05 |
| | | | 0.7340E 04 |
| | | | 0.2273E 04 |
| | | | 0.2546E 03 |
| | | | 0.2533E 02 |
| | | | 0.4173E 04 |
| | | | 0.3173E 04 |
| 51 | MO99 | 66.0CH | 0.5247E 04 |
| | | | 0.2522E 03 |
| | | | 0.1016E 02 |
| | | | 0.3535E 02 |
| | | | 0.3515E 01 |
| | | | |
| | | | |
| 52 | MO101 | 14.6CH | 0.1632E 02 |
| | | | 0.1513E 01 |
| | | | 0.5147E 03 |
| | | | 0.2334E 01 |
| | | | 0.2549E 03 |
| | | | 0.7237E 01 |
| | | | 0.3770E 02 |
| 53 | NA24 | 15.0CH | 0.3329E 04 |
| | | | 0.1155E 04 |
| | | | 0.1562E 04 |
| 54 | NB24M | 6.6CH | 0.3745E 01 |
| 55 | ND147 | 11.5CH | 0.4560E 02 |
| | | | 0.6267E 02 |
| | | | 0.3261E 02 |
| | | | 0.3791E 01 |
| | | | 0.3006E 02 |
| | | | 0.1437E 03 |
| | | | 0.4012E 01 |
| 56 | NI65 | 2.6CH | 0.6054E 01 |
| | | | 0.9217E 01 |
| | | | 0.7463E 01 |
| | | | 0.3403E 01 |
| 57 | OS191 | 16.0CH | 0.9473E 00 |
| | | | |
| 58 | OS193 | 32.0CH | 0.1027E 05 |
| 59 | PR142 | 19.2CH | 0.4875E 04 |
| | | | 0.2399E 03 |
| | | | 0.1131E 03 |
| | | | 0.1756E 04 |
| | | | 0.5578E 04 |
| 60 | PT197 | 18.0CH | 0.4515E 03 |
| | | | 0.6734E 02 |
| 61 | PT199 | 30.0CH | 0.5050E 02 |
| | | | 0.1325E 02 |
| 62 | AU199 | 3.2CH | 0.4325E 02 |
| | | | 0.2325E 02 |
| | | | 0.4185E 03 |
| | | | 0.3166E 03 |
| | | | 0.4632E 03 |
| | | | 0.2700E 01 |
| | | | 0.8377E 01 |
| 63 | RB86 | 19.0CH | 0.1562E 01 |
| | | | |

TABLE IV (continued)

| ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY |
|---------|-----------|-----------------|----------------------|
| 64 | RB88 | 17.80M | 908 |
| | | | 1390 |
| | | | 1350 |
| | | | 2110 |
| | | | 2680 |
| | | | 3010 |
| | | | 3240 |
| | | | 4370 |
| | | | 828 |
| | | | 1093 |
| | | | 1650 |
| | | | 1938 |
| | | | 2213 |
| | | | 3343 |
| | | | 0.2123E 02 |
| 65 | RE186 | 3.80D | 123 |
| | | | 137 |
| | | | 631 |
| | | | 763 |
| 66 | RE188 | 17.00M | 155 |
| | | | 478 |
| | | | 633 |
| 67 | RU97 | 2.80D | 109 |
| | | | 216 |
| | | | 325 |
| 68 | RU103 | 47.00D | 440 |
| | | | 498 |
| | | | 560 |
| | | | 610 |
| 69 | RU105 | 4.50M | 130 |
| | | | 726 |
| 70 | S37 | 7.04M | 3100 |
| | | | 2075 |
| 71 | SB122 | 0.80D | 564 |
| | | | 686 |
| | | | 1140 |
| | | | 1260 |
| 72 | SB124 | 60.00D | 603 |
| | | | 646 |
| | | | 714 |
| | | | 723 |
| | | | 970 |
| | | | 1322 |
| | | | 1694 |
| | | | 2090 |
| | | | 672 |
| | | | 1068 |
| | | | 0.3923E 04 |
| 73 | SC46 | 38.00D | 395 |
| | | | 1119 |
| 74 | SE75 | 100.00D | 121 |
| | | | 136 |
| | | | 200 |
| | | | 265 |
| | | | 380 |
| | | | 515 |
| | | | 402 |
| 75 | SE11M | 26.00M | 103 |
| | | | 0.6269E 05 |
| 76 | SI31 | 7.60M | 1260 |
| | | | 0.1648E-01 |
| 77 | SM153 | 47.00M | 103 |
| | | | 170 |
| | | | 543 |
| | | | 615 |
| 78 | SN117 | 120.00D | 260 |
| | | | 592 |
| 79 | SN117M | 14.00D | 157 |
| | | | 0.1725E 02 |
| 80 | SN123 | 40.00M | 153 |
| | | | 0.1630E 03 |
| 81 | SV125M | 7.50M | 326 |
| | | | 640 |
| | | | 1070 |
| | | | 1394 |
| 82 | SR85 | 65.00D | 512 |
| | | | 0.5402E 02 |
| 83 | SR87M | 2.80M | 388 |
| | | | 0.1413E 04 |
| 84 | TA182M | 16.50M | 180 |
| | | | 0.3755E 02 |
| 85 | TA182 | 115.00D | 100 |
| | | | 114 |
| | | | 152 |
| | | | 179 |
| | | | 222 |
| | | | 1122 |
| | | | 1169 |
| | | | 1222 |
| | | | 1231 |
| | | | 0.6284E 04 |

TABLE IV (continued)

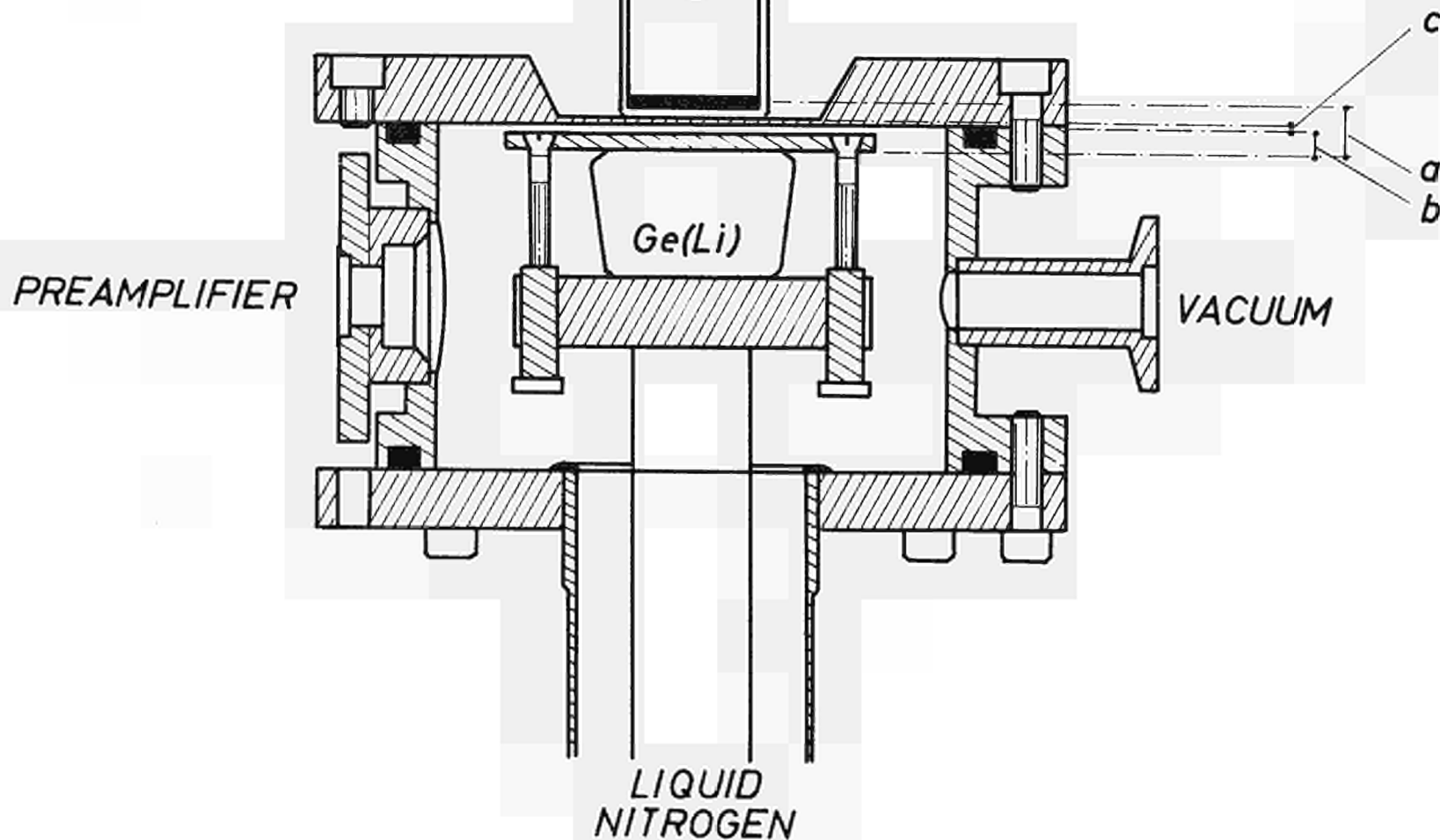
| ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY |
|---------|-----------|-----------------|----------------------|
| 86 | Tl160 | 75.00D | |
| | | 197 | 0.3960E 05 |
| | | 299 | 0.5800E 05 |
| | | 301 | 0.4287E 04 |
| | | 330 | 0.1321E 05 |
| | | 364 | 0.1389E 05 |
| | | 1180 | 0.4493E 04 |
| | | 1270 | 0.2374E 04 |
| 87 | Il31 | 3.10D | |
| | | 284 | 0.4977E 02 |
| | | 364 | 0.5239E 03 |
| | | 637 | 0.2476E 02 |
| | | 722 | 0.6396E 01 |
| 88 | Pa233 | 27.00D | |
| | | 301 | 0.3361E 04 |
| | | 317 | 0.2116E 05 |
| | | 341 | 0.7584E 03 |
| | | 400 | 0.6240E 03 |
| 89 | Tl51 | 5.80M | |
| | | 323 | 0.1962E 03 |
| | | 405 | 0.1074E 01 |
| | | 928 | 0.1652E 02 |
| 90 | Np239 | 2.35D | |
| | | 106 | 0.2004E 05 |
| | | 228 | 0.5660E 04 |
| | | 278 | 0.4008E 04 |
| 91 | V52 | 3.75M | |
| | | 1440 | 0.1447E 05 |
| 92 | W187 | 24.00H | |
| | | 134 | 0.2118E 05 |
| | | 480 | 0.7520E 04 |
| | | 552 | 0.2366E 04 |
| | | 619 | 0.1522E 04 |
| | | 626 | 0.9427E 04 |
| | | 771 | 0.7608E 03 |
| | | 866 | 0.3920E 03 |
| 93 | Yb169 | 32.00D | |
| | | 110 | 0.6439E 05 |
| | | 113 | 0.6134E 04 |
| | | 131 | 0.3266E 04 |
| | | 177 | 0.5166E 04 |
| | | 197 | 0.7477E 05 |
| | | 261 | 0.8531E 04 |
| | | 308 | 0.1479E 05 |
| 94 | Yb175 | 4.20D | |
| | | 114 | 0.1264E 05 |
| | | 133 | 0.7579E 03 |
| | | 145 | 0.1962E 04 |
| | | 251 | 0.7275E 03 |
| | | 283 | 0.9837E 04 |
| | | 396 | 0.9335E 04 |
| 95 | Yb177 | 1.90H | |
| | | 118 | 0.5665E 02 |
| | | 140 | 0.3771E 02 |
| | | 147 | 0.3382E 03 |
| | | 250 | 0.3502E 01 |
| | | 1070 | 0.1521E 02 |
| | | 1120 | 0.1936E 01 |
| | | 1240 | 0.1167E 02 |
| 96 | Zn65 | 245.00D | |
| | | 511 | 0.2637E 02 |
| | | 1114 | 0.1411E 03 |
| 97 | Zn69M | 13.80H | |
| | | 432 | 0.2144E 03 |
| 98 | Zr95 | 65.00D | |
| | | 722 | 0.2472E 02 |
| | | 754 | 0.2543E 02 |
| 99 | Nb95 | 35.00D | |
| | | 765 | 0.5100E 02 |
| 100 | Zr97 | 17.00H | |
| | | 665 | 0.6334E 01 |
| | | 747 | 0.5320E 01 |
| | | 1350 | 0.1176E-00 |
| | | 1620 | 0.4610E-01 |
| | | 2200 | 0.1411E-01 |
| | | 593 | 0.2408E-02 |
| | | 1173 | 0.1335E-01 |

FIGURE 3. Schematic representation of the counting geometry used in this work.

- a) Source-crystal distance: 9 mm
- b) Distance between the crystal and the window of the chamber: 4 mm
- c) Thickness of the window: 1 mm

S Radioactive source in glass bottle:
 diameter 22 mm
 thickness 2 mm.

The Ge(Li) detector used has an active volume of $11 \pm 1 \text{ cm}^3$



activation analysis. The symbol of the isotope is given next. It is followed between parenthesis by the value of the index KD which is (0) if all the numerical data used for the isotope are taken from the literature.

If some experimental values have been adopted this index is (1).

In the third column the half-life is reported then ~~the~~ energies for the different peaks produced by the isotope, are given. The values corresponding to photoelectric peaks are preceded by the index (2), for the double escape peaks the index (3) has been chosen.

Then the specific activity in c.p.m. under the peaks for the particular detector considered, is reported. It corresponds to the saturation and the irradiation of one μgm of element at a flux of 10^{13} thermal neutrons/cm²sec.

The last column gives the relative specific activity in percents of the largest peak.

An exemple of the output data, obtained for a Ge-Li drifted detector of a coaxial type, with an active volume of 11 cm³, is given in Appendix 2. The source geometry is a thin disk of 22 mm diameter, placed at 9 mm from the upper surface of the detector, as shown on Figure 3.

ACKNOWLEDGEMENT.

Drs. F.Cappellani and G.Restelli who have furnished us the Ge-Li drifted detector used in this work, are gratefully acknowledged.

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A P P E N D I X 1

Listing of the program LIBRAR

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C      THIS PROGRAM TRANSFORMS THE GIVEN LIST OF RADIOISOTOPES IN DIFFER-
C      ENT LIBRARIES
C      CALCULATES THE ENERGIES DUE TO DOUBLE ESCAPE PEAKS FORMATION, THE
C      1 SPECIFIC ACTIVITIES AND THE RELATIVE ABUNDANCE OF EACH PHOTOPeAK
C
C      DIMENSION M(10),NUM(1000),TAB1(150),TAB2(150),ELEM(130),TP(130),T(
1130),NE(130),SIGMA(130),KV(20),A(20),AB(130,20),KEV(130,20),NEP(13
20),LUM(500),MX(10)
C      DIMENSION KD(130),KP(130,20)
C
C      M(1)=1
C      M(2)=123
C      M(3)=M(2)*123
C      M(4)=M(3)*123
C      M(5)=M(4)*123
C      DO 1 I=1,5000
1 NUM(I)=0
C
C      READ (5,101) L2,L3,NTAB1,NTAB2
C
C      READ (5,102) (TAB1(I),I=1,NTAB1)
C      READ (5,103) (TAB2(I),I=1,NTAB2)
C
C      WRITE (6,105) (I,I=1,5)
C      WRITE (6,107) (TAB1(I),I=1,NTAB1)
C      WRITE (6,206) (I,I=1,5)
C      WRITE (6,107) (TAB2(I),I=1,NTAB2)
C
101 FORMAT (4I3)
103 FORMAT (9E8.3)
105 FORMAT (1H1,28H0 GAMMA PEAKS EFFICIENCY TABLE/1H0,6X11,4(10X11)/1H0)
206 FORMAT (1H1,36HDOUBLE ESCAPE PEAKS EFFICIENCY TABLE/1H0,6X11,4(10X
111)/1H0)
107 FORMAT ((1H0,1P5E11.3))
111 FORMAT (A6,F5.2,A1,I6,E9.3,4X,I1)
113 FORMAT (6(14,E8.3))
115 FORMAT (1H0,19HWARNING.....,I6,I6,I6/1H0)
C
C      READ (5,101) NELEM
C      NEF=1000
C      DO 20 J=1,NELEM
C      READ (5,111) ELEM(J),TP(J),T(J),NE(J),SIGMA(J),KD(J)
C      IF(NEF-45)154,155,155
155 WRITE (6,209)
C      NEF=0
154 KE=NE(J)
C      KEF=KE
C      READ (5,112) (KV(I),A(I),I=1,KE)
C      WRITE (6,208) J,ELEM(J),TP(J),T(J),SIGMA(J),KD(J)
C      WRITE (6,210) (KV(I),A(I),I=1,KE)
C      NEF=NEF+KEF+1
209 FORMAT (1H1,65H ISOTOPE HALF LIFE SIGMA ENERGY(KE
1V) ABUNDANCE//)
208 FORMAT (1H0,I3,A9,F9.2,A2,6X,1P5E9.3,1H(11,14))

```


C 210 FORMAT (1H+,45X,1H,7X,1PE9.7/(45X,1H,7X,1PE9.3))

```

DO 10 K=1,KE
IT=KV(K)/50+1
EV=KV(K)-50*(IT-1)
EV=EV/50.0
AB(J,K)=A(K)*(TAB1(IT)+EV*(TAB1(IT+1)-TAB1(IT)))*SIGMA(J)*6.E+3
KP(J,K)=2
KEV(J,K)=KV(K)
IF(IT-30)10,2,2
2 KEF=KEF+1
KEV(J,KEF)=KV(K)-1000
AB(J,KEF)=A(K)*(TAB2(IT)+EV*(TAB2(IT+1)-TAB2(IT)))*SIGMA(J)*6.E+3
KP(J,KEF)=3
10 CONTINUE
NEP(J)=KEF
DO 20 I=1,KEF
IND=KEV(J,I)
DO 11 K=1,5
IF(NUM(IND)/M(K))12,12,11
11 CONTINUE
WRITE (6,115) J,I,KEV(J,I)
GO TO 20
12 NUM(IND)=J*M(K)+NUM(IND)
20 CONTINUE
K=0
DO 30 I=1,5000
IF(NUM(I))30,30,24
24 K=K+1
NUM(K)=NUM(I)
LUM(K)=I
30 CONTINUE
KLUM=K

```

```

C 31 DO 40 I=1,K
IF(MOD(I,50)-1)33,32,33
32 WRITE (6,121)
33 DO 34 J=1,5
MX(J)=MOD(NUM(I)/M(J),123)
IF(MX(J))34,36,34
34 CONTINUE
GO TO 38
36 J=J-1
38 DO 39 I2=1,5
IND=MX(I2)
39 A(I2)=ELEM(IND)
WRITE (6,123) I,LUM(I),(MX(KA),A(KA),KA=1,J)

```

```

40 CONTINUE
C IF(L2)999,999,41
41 LET=1000
DO 50 I=1,NELEM
IF(LET-48)44,42,42
42 WRITE (6,123)
LET=0

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44 WRITE (6,125) I,ELEM(I),TP(I),T(I),KEV(I,1),AB(I,1)
   KEF=NEP(I)
   IF(KEF-1)50,50,46
46 DO 48 J=2,KEF
48 WRITE (6,127) KEV(I,J),AB(I,J)
50 LET=LET+KEF+1

C
   IF(L3) 999,999,100
100 LET=1000
   DO 150 MI=1,K
   DO 106 J=1,5
   MX(J)=MOD(NUM(MI)/M(J),128)
   IF(MX(J))106,103,106
106 CONTINUE
   GO TO 110
108 J=J-1
110 JX=J
   DO 140 I2=1,JX
   I=MX(I2)
   KEF=NEP(I)
   BIG=0.0
   DO 114 J=1,KEF
   IF(BIG-AB(I,J))112,114,114
112 BIG=AB(I,J)
114 CONTINUE
   DO 116 J=1,KEF
116 A(J)=AB(I,J)*100.0/BIG
   IF(LET-45)120,118,118
118 WRITE (6,129)
   LET=0
120 WRITE (6,131) LUM(MI),ELEM(I),KD(I),TP(I),T(I),KP(I,1),KEV(I,1),AB
   (I,1),A(1)
   IF(KEF-1)126,126,122
122 DO 124 J=2,KEF
124 WRITE (6,133) KP(I,J),KEV(I,J),AB(I,J),A(J)
126 LET=LET+KEF+1
140 CONTINUE
150 CONTINUE

C
121 FORMAT (1H1,5X11ENERGY(KEV),20X8HISOTOPES/1H0)
123 FORMAT (1H ,13,6X14,5(7X14,A8))
125 FORMAT (1H0,13,A2,F2.2,A2,11X,16,6X,E14.4)
127 FORMAT (1H ,34X,16,6X,E14.4)
128 FORMAT (1H1,5X,7HISOTOPE,2X,9HHALF LIFE,11X,8HENERGIES,10X,8HSPECI
1FIC/37X,3HKEV,13X,8HACTIVITY////)
129 FORMAT (1H1,2X,6HENERGY,6X,7HISOTOPE,4X,9HHALF LIFE,11X,3HENERGIES
1,3X,8HSPECIFIC,4X,8HRELATIVE/5X,3HKEV,41X,3HKEV,5X,8HACTIVITY,3X,9
2HABUNDANCE////)
131 FORMAT (1H0,16,5X,A2,1H(11,1H),F2.2,A2,9X,1H(11,1H),15,1PE14.5,0PF
111.5)
133 FORMAT (1H ,43X,1H(11,1H),15,1PE14.5,0PF11.5)

C
   WRITE (6,134)
134 FORMAT (1H0/////39H (0) THEORETICAL VALUES OF ABUNDANCES//40H (1)
1 EXPERIMENTAL VALUES OF ABUNDANCES//17H (2) PHOTOPEAKS//25H (3)
2 DOUBLE ESCAPE PEAKS)
999 STOP
END

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A P P E N D I X 2 - Output data of the program

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|---|---|---|
| 80 | HO166(0) | 27.30H | (2) 30 (2) 1360 (2) 1530 (2) 1610 (3) 503 (3) 588 | 1.57992E 05 6.44906E 02 1.09477E 02 5.17493E 01 1.43022E 01 8.75556E 00 | 100.00000 0.40819 0.06929 0.03275 0.00905 0.00554 |
| 94 | DY165(0) | 2.32H | (2) 94 (2) 279 (2) 355 | 1.41810E 06 5.74785E 04 7.86758E 04 | 100.00000 4.05320 5.54798 |
| 100 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 1122 (2) 1189 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |
| 103 | SE21M(0) | 26.00M | (2) 103 | 6.86898E 04 | 100.00000 |
| 103 | SM153(0) | 47.00H | (2) 103 (2) 170 (2) 543 (2) 615 | 3.65013E 05 1.46160E 02 9.02070E 02 1.17450E 01 | 100.00000 0.04004 0.24713 0.00322 |
| 106 | NP239(0) | 2.35D | (2) 106 (2) 228 (2) 278 | 2.00407E 04 5.65985E 03 4.80803E 03 | 100.00000 28.24176 23.99128 |
| 109 | RU97(0) | 2.90D | (2) 109 (2) 216 (2) 325 | 5.71398E 00 2.07547E 02 8.35812E 00 | 2.75311 100.00000 4.02711 |
| 110 | YB169(0) | 32.00D | (2) 110 (2) 118 (2) 131 (2) 177 (2) 197 (2) 261 (2) 308 | 6.43926E 04 6.13367E 03 3.26619E 03 5.16576E 03 7.47658E 04 8.58129E 03 1.47907E 04 | 86.12576 8.20384 4.36856 6.90926 100.00000 11.47757 19.78265 |
| 112 | ER171(0) | 7.50H | (2) 112 (2) 117 (2) 124 (2) 296 (2) 308 | 6.31319E 03 4.56019E 02 2.18131E 03 2.22640E 03 6.53470E 03 | 96.61030 6.97843 33.38046 34.07046 100.00000 |
| 113 | LU177(0) | 6.80D | (2) 113 (2) 208 (2) 250 (2) 351 | 7.81073E 04 9.80087E 04 1.03810E 04 5.55707E 03 | 79.69428 100.00000 10.59188 5.66997 |
| 114 | HF175(0) | 70.00D | (2) 114 (2) 230 (2) 343 (2) 430 | 1.96821E 02 2.07095E 03 1.64405E 04 1.84531E 02 | 1.19717 12.59662 100.00000 1.12242 |
| 114 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 1122 (2) 1189 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |
| 114 | YB175(0) | 4.20D | (2) 114 (2) 138 (2) 145 (2) 251 (2) 283 (2) 396 | 1.26365E 04 7.57896E 02 1.96238E 03 7.27541E 02 9.83735E 03 9.38504E 03 | 100.00000 5.99767 15.52942 5.75745 77.84860 74.26920 |
| 117 | ER171(0) | 7.50H | (2) 112 (2) 117 (2) 124 (2) 296 (2) 308 | 6.31319E 03 4.56019E 02 2.18131E 03 2.22640E 03 6.53470E 03 | 96.61030 6.97843 33.38046 34.07046 100.00000 |
| 118 | YB169(0) | 32.00D | (2) 110 (2) 118 (2) 131 (2) 177 (2) 197 (2) 261 (2) 308 | 6.43926E 04 6.13367E 03 3.26619E 03 5.16576E 03 7.47658E 04 8.58129E 03 1.47907E 04 | 86.12576 8.20384 4.36856 6.90926 100.00000 11.47757 19.78265 |
| 118 | YB177(0) | 1.90H | (2) 118 (2) 140 (2) 147 (2) 950 (2) 1090 (2) 1120 (2) 1240 | 5.66496E 01 3.77136E 01 8.38184E 02 3.50208E 00 1.52099E 01 1.98634E 00 1.16683E 01 | 6.75861 4.49944 100.00000 0.41782 1.81462 0.23698 1.39210 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|---|---|--|
| 121 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 9.89691E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 121 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 688 | 4.55980E 01 6.26661E 01 8.23081E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63844 20.92167 100.00000 2.93112 4.21299 |
| 121 | SF75(0) | 120.00D | (2) 121 (2) 136 (2) 200 (2) 265 (2) 280 (2) 315 (2) 402 | 1.73259E 03 5.25267E 03 1.14444E 02 2.81918E 03 1.13606E 03 4.10366E 01 3.63161E 02 | 32.98496 100.00000 2.17878 53.67130 22.58004 0.78125 6.91383 |
| 122 | EU152M(0) | 9.20H | (2) 122 (2) 344 (2) 837 (2) 961 (2) 983 (2) 1327 (2) 1410 | 1.21636E 06 1.28396E 05 1.43627E 05 1.24085E 05 1.12253E 04 1.99255E 04 1.36009E 04 | 100.00000 10.55571 11.80788 10.20128 0.92286 1.63812 1.11816 |
| 123 | EU154(0) | 16.00Y | (2) 123 (2) 248 (2) 593 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (2) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.15388 6.01496 |
| 123 | RE186(0) | 3.80D | (2) 123 (2) 137 (2) 631 (2) 768 | 8.52687E 03 8.79413E 04 7.38173E 01 3.37534E 01 | 9.69609 100.00000 0.08394 0.03838 |
| 124 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E-01 1.01035E-01 2.63710E-02 2.93763E-02 3.11351E-02 6.91242E-02 4.48688E-03 1.91347E-04 5.89182E-04 8.03722E-04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 124 | ER171(0) | 7.50H | (2) 112 (2) 117 (2) 124 (2) 296 (2) 308 | 6.31319E 03 4.56019E 02 2.18131E 03 2.22640E 03 6.53470E 03 | 96.61030 6.97843 33.38046 34.07046 100.00000 |
| 127 | CS134M(0) | 3.20H | (2) 127 (2) 137 | 3.56496E 03 3.32976E 00 | 100.00000 0.09340 |
| 129 | OS191(0) | 16.00D | (2) 129 | 1.02698E 04 | 100.00000 |
| 130 | MO101(0) | 14.60M | (2) 130 (2) 183 (2) 192 (2) 235 (2) 307 (2) 545 (2) 960 | 1.63238E 01 1.91840E 00 5.14738E 02 2.98356E 00 2.49143E 02 7.98660E 00 3.76992E 01 | 3.17129 0.37269 100.00000 0.57963 48.40191 1.55159 7.32396 |
| 130 | RU105(0) | 4.50H | (2) 130 (2) 726 | 1.18560E 03 4.73274E 02 | 100.00000 39.91849 |
| 131 | YB169(0) | 32.00D | (2) 110 (2) 118 (2) 131 (2) 177 (2) 197 (2) 261 (2) 308 | 6.43926E 04 6.13367E 03 3.26619E 03 5.16576E 03 7.47658E 04 8.58129E 03 1.47907E 04 | 86.12576 8.20384 4.36856 6.90926 100.00000 11.47757 19.78265 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|---|--|--|
| 133 | HF181(1) | 45.00D | (2) 133 (2) 136 (2) 137 (2) 346 (2) 482 (2) 616 | 3.33030E 04 4.59280E 03 1.39136E 03 3.46245E 03 1.25012E 04 2.01589E 03 | 100.00000 13.79096 4.17790 10.39683 37.53785 6.05318 |
| 133 | HC197M(0) | 24.00H | (2) 133 (2) 164 | 4.17036E 03 5.56262E 02 | 100.00000 13.33846 |
| 134 | W187(0) | 24.00H | (2) 134 (2) 480 (2) 552 (2) 619 (2) 626 (2) 774 (2) 866 | 2.11791E 04 7.52026E 03 2.36650E 03 1.52181E 03 9.42705E 03 7.60750E 02 3.92049E 02 | 100.00000 35.50785 11.17371 7.18542 44.51101 3.59198 1.85111 |
| 136 | HF181(1) | 45.00D | (2) 133 (2) 136 (2) 137 (2) 346 (2) 482 (2) 616 | 3.33030E 04 4.59280E 03 1.39136E 03 3.46245E 03 1.25012E 04 2.01589E 03 | 100.00000 13.79096 4.17790 10.39683 37.53785 6.05318 |
| 136 | SE75(0) | 120.00D | (2) 121 (2) 136 (2) 200 (2) 265 (2) 280 (2) 315 (2) 402 | 1.73259E 03 5.25267E 03 1.14444E 02 2.81918E 03 1.18606E 03 4.10366E 01 3.63161E 02 | 32.98496 100.00000 2.17878 53.67130 22.58004 0.78125 6.91383 |
| 137 | CS134M(0) | 3.20H | (2) 127 (2) 137 | 3.56496E 03 3.32976E 00 | 100.00000 0.09340 |
| 137 | HF181(1) | 45.00D | (2) 133 (2) 136 (2) 137 (2) 346 (2) 482 (2) 616 | 3.33030E 04 4.59280E 03 1.39136E 03 3.46245E 03 1.25012E 04 2.01589E 03 | 100.00000 13.79096 4.17790 10.39683 37.53785 6.05318 |
| 137 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1085 (2) 1274 (2) 1487 (2) 2090 (3) 465 (3) 1068 | 1.07135E 05 2.92425E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57653 14.62646 10.26663 1.51340 11.04283 |
| 137 | RE186(0) | 3.80D | (2) 123 (2) 137 (2) 631 (2) 768 | 8.52687E 03 8.79413E 04 7.38173E 01 3.37534E 01 | 9.69609 100.00000 0.08394 0.03838 |
| 138 | YB175(0) | 4.20D | (2) 114 (2) 138 (2) 145 (2) 251 (2) 283 (2) 396 | 1.26365E 04 7.57896E 02 1.96238E 03 7.27541E 02 9.83735E 03 9.38504E 03 | 100.00000 5.99767 15.52942 5.75745 77.84860 74.26920 |
| 139 | OS193(0) | 32.00H | (2) 139 (2) 281 (2) 321 (2) 388 (2) 460 | 4.87484E 03 2.39833E 02 1.13108E 02 1.75638E 02 5.57777E 03 | 87.39767 4.29981 2.02783 3.14889 100.00000 |
| 140 | MO99(0) | 66.00H | (2) 140 (2) 181 (2) 372 (2) 740 (2) 780 | 5.74725E 03 2.38885E 02 1.01591E 01 3.65522E 01 3.31487E 00 | 100.00000 4.15650 0.17677 0.63600 0.05768 |
| 140 | YB177(0) | 1.90H | (2) 118 (2) 140 (2) 147 (2) 950 (2) 1090 (2) 1120 (2) 1240 | 5.66496E 01 3.77136E 01 8.38184E 02 3.50208E 00 1.52099E 01 1.98634E 00 1.16683E 01 | 6.75861 4.49944 100.00000 0.41782 1.81462 0.23698 1.39210 |
| 142 | CE141(0) | 32.00D | (2) 142 | 4.12304E 03 | 100.00000 |
| 145 | FE59(0) | 45.00D | (2) 145 (2) 191 (2) 1098 (2) 1289 | 1.90740E 00 4.09568E 00 7.51634E 00 4.65355E 00 | 25.37672 54.49029 100.00000 61.91240 |
| 145 | YB175(0) | 4.20D | (2) 114 (2) 138 (2) 145 (2) 251 (2) 283 (2) 396 | 1.26365E 04 7.57896E 02 1.96238E 03 7.27541E 02 9.83735E 03 9.38504E 03 | 100.00000 5.99767 15.52942 5.75745 77.84860 74.26920 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 147 | YB177(0) | 1.20H | (2) 113 (2) 140 (2) 147 (2) 950 (2) 1090 (2) 1120 (2) 1240 | 5.66496E 01 3.77136E 01 8.38184E 02 3.50208E 00 1.52099E 01 1.98634E 00 1.16683E 01 | 6.75861 4.49244 100.00000 0.41782 1.81462 0.23698 1.39210 |
| 150 | CD111M(0) | 6.70H | (2) 150 (2) 246 | 1.96560E 02 4.04140E 02 | 48.63663 100.00000 |
| 152 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 222 (2) 1122 (2) 1182 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |
| 153 | SN123(0) | 40.00M | (2) 153 | 1.67978E 02 | 100.00000 |
| 155 | RE189(0) | 17.00H | (2) 155 (2) 479 (2) 633 | 6.63768E 04 9.73728E 02 1.05084E 03 | 100.00000 1.46697 1.58314 |
| 158 | AU199(0) | 3.20D | (2) 158 (2) 202 | 2.97241E 03 4.73709E 02 | 100.00000 15.89942 |
| 159 | SN117M(1) | 14.00D | (2) 159 | 1.79497E 01 | 100.00000 |
| 164 | PG197M(0) | 24.00H | (2) 157 (2) 164 | 4.17036E 03 5.56262E 02 | 100.00000 13.33346 |
| 166 | BA130(1) | 1.42H | (2) 166 (2) 1410 | 1.60279E 03 7.50120E 01 | 100.00000 4.68010 |
| 170 | SM153(0) | 47.00H | (2) 103 (2) 170 (2) 543 (2) 615 | 3.65013E 05 1.46160E 02 7.02070E 02 1.17450E 01 | 100.00000 0.04004 0.24713 0.00322 |
| 172 | MG27(0) | 9.50M | (2) 172 (2) 343 (2) 1015 | 4.72282E 00 5.16499E 01 1.70807E 01 | 9.14390 100.00000 33.07019 |
| 177 | YB169(0) | 32.00D | (2) 110 (2) 113 (2) 131 (2) 177 (2) 197 (2) 261 (2) 308 | 6.43926E 04 6.13367E 03 3.26612E 03 5.16576E 03 7.47658E 04 9.53129E 03 1.47907E 04 | 36.12576 8.20384 4.36856 6.90926 100.00000 11.47757 19.78265 |
| 179 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 222 (2) 1122 (2) 1182 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |
| 180 | TA182M(0) | 16.50M | (2) 130 | 8.75520E 01 | 100.00000 |
| 181 | MO99(0) | 66.00H | (2) 140 (2) 131 (2) 372 (2) 740 (2) 780 | 5.74725E 02 2.38885E 02 1.01591E 01 3.65522E 01 3.31487E 00 | 100.00000 4.15650 0.17677 0.63600 0.05768 |
| 183 | MO101(0) | 14.60M | (2) 130 (2) 183 (2) 192 (2) 235 (2) 307 (2) 545 (2) 960 | 1.63238E 01 1.91840E 00 5.14738E 02 2.98356E 00 2.49143E 02 7.98660E 00 3.76992E 01 | 3.17129 0.37269 100.00000 0.57963 48.40191 1.55159 7.32396 |
| 191 | FE59(0) | 45.00D | (2) 145 (2) 191 (2) 1098 (2) 1282 | 1.90740E 00 4.09563E 00 7.51634E 00 4.65355E 00 | 25.37672 54.49029 100.00000 61.91240 |
| 191 | PT197(0) | 18.00H | (2) 191 (2) 279 | 5.04986E 01 1.82511E 01 | 100.00000 36.14169 |
| 192 | HG197(0) | 2.70D | (2) 192 | 1.43335E 02 | 100.00000 |
| 192 | IN114M(0) | 49.00D | (2) 192 (2) 556 (2) 722 (2) 1299 | 9.52646E 03 3.73464E 02 2.63290E 02 3.78360E 00 | 100.00000 3.92028 2.76377 0.03972 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|--|---|
| 192 | MO101(0) | 14.60M | (2) 130 (2) 133 (2) 132 (2) 235 (2) 307 (2) 545 (2) 960 | 1.63238E 01 1.91840E 00 5.14738E 02 2.98356E 00 2.49143E 02 7.98660E 00 3.76992E 01 | 3.17129 0.37269 100.00000 0.57963 48.40191 1.55159 7.32396 |
| 197 | PT199(0) | 30.00M | (2) 197 (2) 246 (2) 318 (2) 475 (2) 540 (2) 720 (2) 790 (2) 960 | 4.88498E 01 2.32483E 02 4.18535E 02 3.16567E 02 4.68234E 02 9.29995E 00 8.37706E 00 1.56182E 00 | 10.43278 49.65101 89.38595 67.60869 100.00000 1.98618 1.78907 0.33356 |
| 197 | TR160(0) | 73.00D | (2) 197 (2) 299 (2) 331 (2) 330 (2) 964 (2) 1180 (2) 1270 | 3.95956E 04 5.80032E 04 4.28947E 03 1.32108E 04 1.24858E 04 4.49280E 03 2.07360E 03 | 63.26448 100.00000 7.39523 22.77557 21.52598 7.74578 3.57498 |
| 197 | YB169(0) | 32.00D | (2) 110 (2) 113 (2) 131 (2) 177 (2) 197 (2) 261 (2) 303 | 6.43926E 04 6.13367E 03 3.26619E 03 2.16576E 03 7.47653E 04 9.58129E 03 1.47907E 04 | 36.12576 3.20384 4.36856 6.90926 100.00000 11.47757 19.78265 |
| 199 | GE75(0) | 1.33H | (2) 199 (2) 264 (2) 427 (2) 477 (2) 628 | 8.53721E 01 5.23286E 02 6.03936E 00 4.70934E 00 2.35356E 00 | 16.31461 100.00000 1.15412 0.89926 0.45072 |
| 200 | SE75(0) | 120.00D | (2) 121 (2) 136 (2) 200 (2) 265 (2) 230 (2) 315 (2) 402 | 1.73259E 03 5.25267E 03 1.14444E 02 2.81918E 03 1.13606E 03 4.10366E 01 3.65161E 02 | 32.98496 100.00000 2.17878 53.67130 22.58004 0.78125 6.91383 |
| 201 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 533 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 3.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 206 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 463 (2) 485 (2) 533 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 3.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69331 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 208 | LU177(0) | 6.80D | (2) 113 (2) 203 (2) 250 (2) 351 | 7.81073E 04 9.80087E 04 1.03810E 04 5.55707E 03 | 79.69428 100.00000 10.59188 5.66997 |
| 208 | AU199(0) | 3.20D | (2) 158 (2) 203 | 2.97941E 03 4.73709E 02 | 100.00000 15.89942 |
| 210 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 3.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 13.26952 24.14230 8.09839 5.16867 3.93778 1.84834 1.87807 1.25894 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|---|---|---|
| 215 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 369 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1090 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 8.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 18.26952 24.14230 8.09839 5.16867 7.93778 1.84834 1.87807 1.25894 |
| 216 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E-01 1.01035E-01 2.63710E-02 2.93763E-02 3.11351E-02 6.91242E-02 4.48688E-03 1.91347E-04 5.89182E-04 8.03722E-04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 216 | FE130M(0) | 5.50H | (2) 216 (2) 332 (2) 443 (2) 501 | 8.91821E 04 5.89542E 04 3.05449E 04 6.10319E 03 | 100.00000 66.10540 34.25006 6.84351 |
| 216 | RU97(0) | 2.80D | (2) 109 (2) 216 (2) 325 | 5.71398E 00 2.07547E 02 8.35812E 00 | 2.75311 100.00000 4.02711 |
| 220 | GD159(0) | 18.00H | (2) 220 (2) 300 (2) 364 | 6.68678E 01 5.64576E 00 1.29964E 03 | 5.14512 0.66524 100.00000 |
| 222 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 1122 (2) 1189 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 63.97763 20.09456 8.33531 17.16216 8.93824 |
| 228 | NP239(0) | 2.35D | (2) 106 (2) 228 (2) 278 | 2.00407E 04 5.65985E 03 4.80803E 03 | 100.00000 28.24176 23.99128 |
| 230 | GD115(0) | 55.00H | (2) 230 (2) 260 (2) 263 (2) 490 (2) 520 | 3.43475E 01 8.87808E 01 8.93926E 00 2.56122E 02 4.52390E 02 | 7.59244 19.62482 1.98706 56.61526 100.00000 |
| 230 | HF175(0) | 70.00D | (2) 114 (2) 230 (2) 343 (2) 430 | 1.96821E 02 2.07095E 03 1.64405E 04 1.84531E 02 | 1.19717 12.59662 100.00000 1.12242 |
| 232 | GE143(0) | 33.00H | (2) 232 (2) 294 (2) 351 (2) 493 (2) 668 (2) 722 | 7.17336E 01 4.38890E 02 8.43545E 00 2.46183E 01 2.77979E 01 2.51065E 02 | 16.34431 100.00000 1.92199 5.60922 6.33368 57.20459 |
| 235 | MO101(0) | 14.60M | (2) 130 (2) 183 (2) 192 (2) 235 (2) 307 (2) 545 (2) 960 | 1.63238E 01 1.91840E 00 5.14738E 02 2.98356E 00 2.49143E 02 7.98660E 00 3.76992E 01 | 3.17129 0.37269 100.00000 0.57963 48.40191 1.55159 7.32396 |
| 239 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E-01 1.01035E-01 2.63710E-02 2.93763E-02 3.11351E-02 6.91242E-02 4.48688E-03 1.91347E-04 5.89182E-04 8.03722E-04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 245 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 9.89691E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|---|---|---|
| 246 | CD111M(0) | 6.70H | (2) 150 (2) 246 | 1.96560E 02 4.04140E 02 | 48.63663 100.00000 |
| 246 | PT199(0) | 30.00M | (2) 197 (2) 246 (2) 319 (2) 475 (2) 540 (2) 720 (2) 790 (2) 960 | 4.88498E 01 2.32483E 02 4.18535E 02 3.16567E 02 4.68234E 02 9.29995E 00 3.37706E 00 1.56182E 00 | 10.43278 49.65101 89.38595 67.60869 100.00000 1.98618 1.78907 0.33356 |
| 248 | EU154(0) | 16.00Y | (2) 123 (2) 248 (2) 593 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (2) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86286 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 249 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E-01 1.01035E-01 2.63710E-02 2.93763E-02 3.11351E-02 6.91242E-02 4.48688E-03 1.91347E-04 5.89182E-04 8.03722E-04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 250 | LU177(0) | 6.30D | (2) 113 (2) 208 (2) 250 (2) 351 | 7.81073E 04 9.80087E 04 1.03810E 04 5.55707E 03 | 79.69428 100.00000 10.59188 5.66997 |
| 251 | YB175(0) | 4.20D | (2) 114 (2) 133 (2) 145 (2) 251 (2) 283 (2) 396 | 1.26365E 04 7.57896E 02 1.96238E 03 7.27541E 02 9.83735E 03 9.38504E 03 | 100.00000 5.99767 15.52942 5.75745 77.84860 74.26920 |
| 260 | CD115(0) | 55.00H | (2) 230 (2) 260 (2) 263 (2) 490 (2) 520 | 3.43475E 01 8.87808E 01 8.98926E 00 2.56122E 02 4.52390E 02 | 7.59244 19.62482 1.98706 56.61526 100.00000 |
| 260 | SN113(0) | 120.00D | (2) 260 (2) 392 | 3.99360E 00 7.30751E 01 | 5.46506 100.00000 |
| 261 | YB169(0) | 32.00D | (2) 110 (2) 118 (2) 131 (2) 177 (2) 197 (2) 261 (2) 308 | 6.43926E 04 6.13367E 03 3.26619E 03 5.16576E 03 7.47658E 04 8.58129E 03 1.47907E 04 | 86.12576 8.20384 4.36856 6.90926 100.00000 11.47757 19.78265 |
| 263 | CD115(0) | 55.00H | (2) 230 (2) 260 (2) 263 (2) 490 (2) 520 | 3.43475E 01 8.87808E 01 8.98926E 00 2.56122E 02 4.52390E 02 | 7.59244 19.62482 1.98706 56.61526 100.00000 |
| 264 | GE75(0) | 1.33H | (2) 199 (2) 264 (2) 427 (2) 477 (2) 628 | 8.53721E 01 5.23286E 02 6.03936E 00 4.70934E 00 2.35856E 00 | 16.31461 100.00000 1.15412 0.89996 0.45072 |
| 265 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 8.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 13.26952 24.14230 8.09839 5.16867 3.93778 1.84834 1.87807 1.25894 |
| 265 | SE75(0) | 120.00D | (2) 121 (2) 136 (2) 200 (2) 265 (2) 280 (2) 315 (2) 402 | 1.73259E 03 5.25267E 03 1.14444E 02 2.81918E 03 1.18606E 03 4.10366E 01 3.63161E 02 | 32.98496 100.00000 2.17878 53.67130 22.58004 0.78125 6.91383 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|--|---|
| 277 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 688 | 4.55980E 01 6.26661E 01 8.23081E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63844 20.92167 100.00000 2.93112 4.21299 |
| 278 | NP239(0) | 2.35D | (2) 106 (2) 228 (2) 278 | 2.00407E 04 5.65985E 03 4.80803E 03 | 100.00000 28.24176 23.99128 |
| 279 | PY165(0) | 2.32H | (2) 94 (2) 272 (2) 355 | 1.41810E 06 5.74785E 04 7.86758E 04 | 100.00000 4.05320 5.54798 |
| 279 | HG203(0) | 46.50D | (2) 279 | 7.72160E 03 | 100.00000 |
| 279 | PT197(0) | 19.00H | (2) 191 (2) 279 | 5.04986E 01 1.82511E 01 | 100.00000 36.14169 |
| 280 | SE75(0) | 120.00D | (2) 121 (2) 136 (2) 200 (2) 265 (2) 280 (2) 315 (2) 402 | 1.73259E 03 5.25267E 03 1.14444E 02 2.81918E 03 1.18606E 03 4.10366E 01 3.63161E 02 | 32.98496 100.00000 2.17378 53.67130 22.58004 0.78125 6.91383 |
| 281 | OS192(0) | 32.00H | (2) 139 (2) 281 (2) 321 (2) 388 (2) 460 | 4.87484E 03 2.39873E 02 1.13108E 02 1.75638E 02 5.57777E 03 | 37.39767 4.29931 2.02783 3.14889 100.00000 |
| 283 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 283 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 283 | YB175(0) | 4.20D | (2) 114 (2) 138 (2) 145 (2) 251 (2) 233 (2) 396 | 1.26365E 04 7.57896E 02 1.96238E 03 7.27541E 02 9.83735E 03 9.38504E 03 | 100.00000 5.97767 15.52942 5.75745 77.84860 74.26920 |
| 284 | II131(0) | 3.10D | (2) 234 (2) 364 (2) 637 (2) 722 | 4.97678E 01 5.23930E 02 2.47552E 01 6.29638E 00 | 9.49894 100.00000 4.72491 1.20176 |
| 293 | IR194(0) | 12.00H | (2) 293 (2) 329 (2) 620 (2) 643 (2) 937 (2) 1150 (2) 1478 (3) 456 | 3.02112E 04 1.37374E 05 3.13470E 03 1.04762E 04 3.23500E 03 2.51100E 03 1.25058E 02 1.23462E 01 | 21.99200 100.00000 2.28188 7.62605 2.35490 1.82786 0.09103 0.00899 |
| 294 | CE143(0) | 33.00H | (2) 232 (2) 294 (2) 351 (2) 493 (2) 668 (2) 722 | 7.17336E 01 4.38890E 02 8.43545E 00 2.46183E 01 2.77979E 01 2.51065E 02 | 16.34431 100.00000 1.92129 5.60922 6.33368 57.20459 |
| 296 | ER171(0) | 7.50H | (2) 112 (2) 117 (2) 124 (2) 296 (2) 308 | 6.31319E 03 4.56019E 02 2.18131E 03 2.22640E 03 6.53470E 03 | 96.61030 6.97843 33.38046 34.07046 100.00000 |
| 296 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 283 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|--|---|
| 299 | TR160(0) | 73.00D | (2) 197 (2) 299 (2) 391 (2) 890 (2) 964 (2) 1180 (2) 1270 | 3.95956E 04 5.80032E 04 4.28947E 03 1.32106E 04 1.24858E 04 4.49280E 03 2.07360E 03 | 68.26448 100.00000 7.39523 22.77557 21.52598 7.74578 3.57498 |
| 300 | GD159(0) | 18.00H | (2) 220 (2) 300 (2) 364 | 6.68678E 01 8.64576E 00 1.29964E 03 | 5.14512 0.66524 100.00000 |
| 301 | PA233(0) | 27.00D | (2) 301 (2) 313 (2) 341 (2) 400 | 3.26051E 03 2.11594E 04 7.58419E 02 6.24000E 02 | 15.40928 100.00000 3.58432 2.94905 |
| 307 | MO101(0) | 14.60M | (2) 130 (2) 183 (2) 192 (2) 235 (2) 307 (2) 545 (2) 960 | 1.63238E 01 1.91840E 00 5.14738E 02 2.98356E 00 2.49143E 02 7.98660E 00 3.76992E 01 | 3.17129 0.37269 100.00000 0.57963 48.40191 1.55159 7.32396 |
| 308 | ER171(0) | 7.50H | (2) 112 (2) 117 (2) 124 (2) 296 (2) 308 | 6.31319E 03 4.56019E 02 2.18131E 03 2.22640E 03 6.53470E 03 | 96.61030 6.97843 33.39046 34.07046 100.00000 |
| 308 | YB169(0) | 32.00D | (2) 110 (2) 118 (2) 131 (2) 177 (2) 197 (2) 261 (2) 308 | 6.43926E 04 6.13367E 03 3.26619E 03 5.16576E 03 7.47658E 04 2.58129E 03 1.47907E 04 | 86.12576 3.20384 4.36856 6.90726 100.00000 11.47757 19.78285 |
| 309 | IR122(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78949 2.82450 5.37151 3.15032 0.11907 |
| 313 | PA233(0) | 27.00D | (2) 301 (2) 313 (2) 341 (2) 400 | 3.26051E 03 2.11594E 04 7.58419E 02 6.24000E 02 | 15.40928 100.00000 3.58432 2.94905 |
| 315 | SE75(0) | 120.00D | (2) 121 (2) 136 (2) 200 (2) 265 (2) 280 (2) 315 (2) 402 | 1.73259E 03 5.25267E 03 1.14444E 02 2.81918E 03 1.13606E 03 4.10366E 01 3.63161E 02 | 32.98496 100.00000 2.17878 53.67130 22.58004 0.78125 6.91283 |
| 317 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78949 2.82450 5.37151 3.15032 0.11907 |
| 318 | PT199(0) | 30.00M | (2) 197 (2) 246 (2) 318 (2) 475 (2) 540 (2) 720 (2) 790 (2) 960 | 4.88498E 01 2.32483E 02 4.18533E 02 3.16567E 02 4.68234E 02 9.29995E 00 8.37706E 00 1.56182E 00 | 10.43278 42.65101 89.38595 67.60869 100.00000 1.98618 1.78907 0.33356 |
| 321 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 688 | 4.55980E 01 6.26661E 01 3.23081E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63944 20.92167 100.00000 2.93112 4.21299 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|---|--|--|
| 321 | OS193(0) | 32.00H | (2) 132 (2) 241 (2) 321 (2) 398 (2) 460 | 4.87484E 03 2.39333E 02 1.13108E 02 1.72638E 02 5.57777E 03 | 97.39767 4.29931 2.02793 3.14889 100.00000 |
| 323 | TI51(0) | 5.30M | (2) 323 (2) 605 (2) 928 | 1.96241E 02 1.05412E 00 1.85240E 01 | 100.00000 0.53715 7.43941 |
| 325 | CR51(1) | 27.30D | (2) 325 | 1.73016E 03 | 100.00000 |
| 325 | RU97(0) | 2.90D | (2) 109 (2) 216 (2) 325 | 5.71393E 00 2.07547E 02 8.35812E 00 | 2.75311 100.00000 4.02711 |
| 326 | SN125M(0) | 9.50M | (2) 326 (2) 640 (2) 1070 (2) 1394 | 1.24505E 02 1.33947E -01 7.25274E -02 2.94974E -01 | 100.00000 0.10758 0.05825 0.23692 |
| 329 | IR194(0) | 19.00H | (2) 293 (2) 329 (2) 620 (2) 643 (2) 937 (2) 1150 (2) 1478 (2) 456 | 3.02112E 04 1.37374E 05 3.13470E 03 1.04762E 04 3.23500E 03 2.51100E 03 1.25058E 02 1.23462E 01 | 21.99200 100.00000 2.28183 7.62605 2.35490 1.82786 0.09103 0.00899 |
| 329 | LA140(0) | 40.20H | (2) 329 (2) 438 (2) 437 (2) 315 (2) 1600 (2) 2500 (2) 378 (2) 1478 | 2.91762E 04 2.85314E 03 1.93768E 04 8.94344E 03 8.55360E 03 3.84912E 01 1.33650E 03 8.74800E 01 | 100.00000 9.77900 68.12650 30.65315 23.31700 0.13123 4.58078 0.29983 |
| 332 | HF120M(0) | 5.50H | (2) 216 (2) 332 (2) 443 (2) 501 | 8.91821E 04 5.89542E 04 3.05449E 04 6.10319E 03 | 100.00000 66.10540 34.25006 6.84351 |
| 335 | IN115M(0) | 4.50H | (2) 335 | 1.28422E 03 | 100.00000 |
| 341 | PA233(0) | 27.00D | (2) 301 (2) 313 (2) 341 (2) 400 | 3.26051E 03 2.11594E 04 7.58419E 02 6.24000E 02 | 15.40928 100.00000 3.58432 2.94905 |
| 343 | HF175(0) | 70.00D | (2) 114 (2) 230 (2) 343 (2) 430 | 1.96821E 02 2.07095E 03 1.64405E 04 1.84531E 02 | 1.19717 12.59462 100.00000 1.12242 |
| 344 | EU152M(0) | 9.20H | (2) 122 (2) 344 (2) 837 (2) 961 (2) 983 (2) 1327 (2) 1410 | 1.21636E 06 1.28396E 05 1.43627E 05 1.24085E 05 1.12253E 04 1.97255E 04 1.36009E 04 | 100.00000 10.55571 11.80788 10.20128 0.92286 1.63812 1.11816 |
| 344 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 9.89691E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 346 | HF181(1) | 45.00D | (2) 133 (2) 136 (2) 137 (2) 346 (2) 442 (2) 616 | 3.33030E 04 4.59280E 03 1.39136E 03 3.46245E 03 1.25012E 04 2.01589E 03 | 100.00000 13.79096 4.17790 10.39683 37.53795 6.05318 |
| 351 | CE143(0) | 33.00H | (2) 232 (2) 294 (2) 351 (2) 493 (2) 668 (2) 722 | 7.17336E 01 4.38890E 02 8.43545E 00 2.46183E 01 2.77979E 01 2.51065E 02 | 16.34431 100.00000 1.92199 5.60922 6.33368 57.20459 |
| 351 | LU177(0) | 6.80D | (2) 113 (2) 208 (2) 250 (2) 351 | 7.81073E 04 9.80087E 04 1.03810E 04 5.55707E 03 | 79.69428 100.00000 10.59188 5.66997 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|--|---|
| 355 | DY165(0) | 2.32H | (2) 94 (2) 279 (2) 355 | 1.41810E 06 5.74785E 04 7.86758E 04 | 100.00000 4.05320 5.54798 |
| 364 | GD159(0) | 18.00H | (2) 220 (2) 300 (2) 364 | 6.68678E 01 8.64576E 00 1.29964E 03 | 5.14512 0.66524 100.00000 |
| 364 | II31(0) | 8.10D | (2) 234 (2) 364 (2) 637 (2) 722 | 4.97678E 01 5.23930E 02 2.47552E 01 6.29638E 00 | 9.49894 100.00000 4.72491 1.20176 |
| 368 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 3.42904E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 13.26952 24.14230 8.09839 5.16867 3.93778 1.84834 1.87807 1.25894 |
| 368 | NI65(1) | 2.60H | (2) 368 (2) 1114 (2) 1482 (2) 460 | 9.81712E 00 7.46283E 00 8.40342E 00 8.47262E -01 | 100.00000 76.01847 85.59965 8.63045 |
| 372 | MO99(0) | 66.00H | (2) 140 (2) 181 (2) 372 (2) 740 (2) 780 | 5.74725E 03 2.38885E 02 1.01591E 01 3.65522E 01 3.31487E 00 | 100.00000 4.15650 0.17677 0.63600 0.05768 |
| 374 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 428 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E -01 1.01035E -01 2.63710E -02 2.93763E -02 3.11351E -02 6.91242E -02 4.48688E -03 1.91347E -04 5.89182E -04 8.03722E -04 | 100.00000 43.93842 11.46830 12.77523 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 375 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 495 (2) 593 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 3.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 388 | OS193(0) | 32.00H | (2) 139 (2) 281 (2) 321 (2) 388 (2) 460 | 4.87484E 03 2.39833E 02 1.13108E 02 1.75638E 02 5.57777E 03 | 87.39767 4.29981 2.02783 3.14889 100.00000 |
| 388 | SR87M(0) | 2.80H | (2) 388 | 1.41261E 03 | 100.00000 |
| 391 | TB160(0) | 73.00D | (2) 197 (2) 299 (2) 391 (2) 880 (2) 964 (2) 1180 (2) 1270 | 3.95956E 04 5.80032E 04 4.28947E 03 1.32106E 04 1.24858E 04 4.49280E 03 2.07360E 03 | 68.26448 100.00000 7.39523 22.77557 21.52598 7.74578 3.57498 |
| 392 | SN113(0) | 120.00D | (2) 260 (2) 392 | 3.99360E 00 7.30751E 01 | 5.46506 100.00000 |
| 396 | YB175(0) | 4.20D | (2) 114 (2) 138 (2) 145 (2) 251 (2) 283 (2) 396 | 1.26365E 04 7.57896E 02 1.96238E 03 7.27541E 02 9.83735E 03 9.38504E 03 | 100.00000 5.99767 15.52942 5.75745 77.84860 74.26920 |
| 400 | PA233(0) | 27.00D | (2) 301 (2) 313 (2) 341 (2) 400 | 3.26051E 03 2.11594E 04 7.58419E 02 6.24000E 02 | 15.40928 100.00000 3.58432 2.94905 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|---|
| 402 | SE75(0) | 120.00D | (2) 121 (2) 136 (2) 200 (2) 265 (2) 280 (2) 315 (2) 402 | 1.73259E 03 5.25267E 03 1.14444E 02 2.81918E 03 1.18606E 03 4.10366E 01 3.63161E 02 | 32.98496 100.00000 2.17878 53.67130 22.58004 0.78125 6.91383 |
| 406 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1085 (2) 1274 (2) 1437 (2) 2090 (3) 465 (3) 1068 | 1.07135E 05 2.92425E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57653 14.62646 10.26663 1.51340 11.04283 |
| 412 | AU198(0) | 2.69D | (2) 412 (2) 675 (2) 1089 | 4.14259E 05 2.08278E 03 2.61211E 02 | 100.00000 0.50277 0.06305 |
| 412 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 972 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94443E 06 6.45192E 06 1.36000E 05 7.45056E 05 2.82184E 05 9.89691E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 412 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 688 | 4.55980E 01 6.26661E 01 8.23081E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63844 20.92167 100.00000 2.93112 4.21299 |
| 416 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 3.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 53.59226 100.00000 18.26952 24.14230 3.09939 3.16867 3.93778 1.84834 1.87807 1.25894 |
| 417 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 283 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03310E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 33.78755 100.00000 1.21006 1.11806 36.58709 1.78949 2.82450 5.37151 3.15032 0.11907 |
| 427 | GE75(0) | 1.33H | (2) 199 (2) 264 (2) 427 (2) 477 (2) 628 | 8.53721E 01 5.23286E 02 6.03936E 00 4.70934E 00 2.35856E 00 | 16.31461 100.00000 1.15412 0.89996 0.45072 |
| 430 | HF175(0) | 70.00D | (2) 114 (2) 230 (2) 343 (2) 430 | 1.96821E 02 2.07095E 03 1.64405E 04 1.84531E 02 | 1.19717 12.59662 100.00000 1.12242 |
| 438 | LA140(0) | 40.20H | (2) 329 (2) 438 (2) 487 (2) 815 (2) 1600 (2) 2500 (3) 578 (3) 1478 | 2.91762E 04 2.85314E 03 1.98768E 04 8.94344E 03 8.55360E 03 3.84912E 01 1.33650E 03 8.74800E 01 | 100.00000 9.77900 68.12650 30.65315 29.31700 0.13193 4.58078 0.29983 |
| 438 | ZN69M(0) | 13.80H | (2) 438 | 2.14439E 02 | 100.00000 |
| 440 | RU103(0) | 40.00D | (2) 440 (2) 498 (2) 560 (2) 610 | 1.78200E 01 2.64190E 03 1.14307E 01 1.27449E 02 | 0.67452 100.00000 0.43267 4.82414 |
| 441 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 688 | 4.55980E 01 6.26661E 01 8.23081E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63844 20.92167 100.00000 2.93112 4.21299 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|---|
| 443 | HF180M(0) | 5.50H | (2) 216 (2) 332 (2) 443 (2) 501 | 3.91821E 04 5.89542E 04 3.05449E 04 6.10319E 03 | 100.00000 66.10540 34.25006 6.84351 |
| 446 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1384 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 8.02907E 02 1.01771E 03 2.27630E 02 2.53579E 03 9.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 15.29344 11.17220 5.34074 0.60407 |
| 450 | I128(0) | 25.00M | (2) 450 (2) 540 (2) 750 (2) 990 | 5.76576E 03 4.35614E 02 3.12000E 01 3.33216E 01 | 100.00000 7.55519 0.54113 0.57792 |
| 453 | BR82(0) | 35.90H | (2) 554 (2) 612 (2) 699 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (3) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 456 | IR194(0) | 19.00H | (2) 223 (2) 322 (2) 620 (2) 643 (2) 937 (2) 1150 (2) 1478 (3) 456 | 3.02112E 04 1.37374E 05 3.13470E 03 1.04762E 04 7.23500E 03 2.51100E 03 1.23053E 02 1.23462E 01 | 21.99200 100.00000 2.28133 7.62605 2.35490 1.82786 0.09103 0.00399 |
| 460 | NI65(1) | 2.60H | (2) 368 (2) 1114 (2) 1432 (3) 460 | 2.81712E 00 7.46283E 00 8.40242E 00 8.47262E 01 | 100.00000 76.01347 85.59065 9.63045 |
| 460 | OS193(0) | 32.00H | (2) 139 (2) 281 (2) 321 (2) 383 (2) 460 | 4.87484E 03 2.39833E 02 1.13108E 02 1.75638E 02 5.57777E 03 | 37.39767 4.29981 2.02783 3.14839 100.00000 |
| 465 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1035 (2) 1274 (2) 1487 (2) 2090 (2) 465 (3) 1068 | 1.07135E 05 2.92425E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57453 14.62646 10.26663 1.51340 11.04283 |
| 468 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 435 (2) 538 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 39.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 475 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 801 (2) 1038 (2) 1163 (2) 1368 | 2.28150E 03 9.45651E 03 1.59827E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 3.94301E 02 1.29064E 03 | 2.24719 2.31628 15.74232 100.00000 63.11010 6.27241 0.54189 0.88085 1.27123 |
| 475 | PT199(0) | 30.00M | (2) 197 (2) 246 (2) 318 (2) 475 (2) 540 (2) 720 (2) 790 (2) 960 | 4.88438E 01 2.32433E 02 4.18535E 02 3.16567E 02 4.68234E 02 9.29995E 00 8.37706E 00 1.56182E 00 | 10.43278 40.65101 89.33595 67.60869 100.00000 1.98618 1.78907 0.33356 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|---|
| 477 | GE75(0) | 1.33H | (2) 199 (2) 264 (2) 427 (2) 477 (2) 628 | 8.53721E 01 5.23286E 02 6.03936E 00 4.70934E 00 2.35856E 00 | 16.31461 100.00000 1.15412 0.89996 0.45072 |
| 478 | RE186(0) | 17.00H | (2) 155 (2) 478 (2) 633 | 6.63768E 04 9.73728E 02 1.05084E 03 | 100.00000 1.46697 1.58314 |
| 480 | CA47(0) | 4.80D | (2) 480 (2) 830 (2) 1290 | 8.29440E-03 3.86208E-03 2.93832E-02 | 28.22938 13.14384 100.00000 |
| 480 | W187(0) | 24.00H | (2) 134 (2) 480 (2) 552 (2) 619 (2) 626 (2) 774 (2) 866 | 2.11791E 04 7.52026E 03 2.36650E 03 1.52181E 03 9.42705E 03 7.60750E 02 3.92049E 02 | 100.00000 35.50785 11.17371 7.18542 44.51101 3.59198 1.85111 |
| 482 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1384 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 3.02907E 02 1.01771E 03 2.27690E 02 2.58579E 03 3.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 482 | HF181(1) | 45.00D | (2) 133 (2) 136 (2) 137 (2) 346 (2) 482 (2) 616 | 3.33030E 04 4.59280E 03 1.39136E 03 3.46245E 03 1.25012E 04 2.01589E 03 | 100.00000 13.79096 4.17790 10.39683 37.53785 6.05318 |
| 485 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 283 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33956E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11606 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 487 | LA140(0) | 40.20H | (2) 329 (2) 439 (2) 437 (2) 815 (2) 1600 (2) 2500 (3) 578 (3) 1478 | 2.91762E 04 2.85314E 03 1.98768E 04 8.94344E 03 8.55360E 03 3.84912E 01 1.33650E 03 8.74800E 01 | 100.00000 9.77900 68.12650 30.65315 29.31700 0.13193 4.58078 0.29983 |
| 490 | CD115(0) | 55.00H | (2) 230 (2) 260 (2) 263 (2) 490 (2) 520 | 3.43475E 01 8.87808E 01 8.98926E 00 2.56122E 02 4.52390E 02 | 7.59244 19.62482 1.98706 56.61526 100.00000 |
| 493 | CE143(0) | 33.00H | (2) 232 (2) 294 (2) 351 (2) 493 (2) 668 (2) 722 | 7.17336E 01 4.38890E 02 8.43545E 00 2.46183E 01 2.77979E 01 2.51065E 02 | 16.34431 100.00000 1.92199 5.60922 6.33368 57.20459 |
| 498 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E-01 1.01035E-01 2.63710E-02 2.93763E-02 3.11351E-02 6.91242E-02 4.48688E-03 1.91347E-04 5.89182E-04 3.03722E-04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 498 | RU103(0) | 40.00D | (2) 440 (2) 498 (2) 560 (2) 610 | 1.78200E 01 2.64190E 03 1.14307E 01 1.27449E 02 | 0.67452 100.00000 0.43267 4.82414 |
| 501 | HF180M(0) | 5.50H | (2) 216 (2) 332 (2) 443 (2) 501 | 8.91821E 04 5.89542E 04 3.05449E 04 6.10319E 03 | 100.00000 66.10540 34.25006 6.84351 |
| 508 | HO166(0) | 27.30H | (2) 80 (2) 1360 (2) 1530 (2) 1610 (3) 508 (3) 588 | 1.57992E 05 6.44906E 02 1.09477E 02 5.17493E 01 1.43022E 01 8.75556E 00 | 100.00000 0.40813 0.06929 0.03275 0.00905 0.00554 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 508 | K42(0) | 12.50H | (2) 1530 (3) 508 | 6.36552E 01 8.31600E 00 | 100.00000 13.06413 |
| 511 | CU64(1) | 12.80H | (2) 511 (2) 1340 | 1.07536E 04 4.12080E 01 | 100.00000 0.38320 |
| 511 | ZN65(1) | 245.00D | (2) 511 (2) 1114 | 2.63741E 01 1.41076E 02 | 18.69501 100.00000 |
| 513 | SR85(0) | 65.00D | (2) 513 | 5.43215E 01 | 100.00000 |
| 520 | CD115(0) | 55.00H | (2) 230 (2) 260 (2) 263 (2) 490 (2) 520 | 3.43475E 01 8.87808E 01 8.98926E 00 2.56122E 02 4.52390E 02 | 7.59244 19.62482 1.98706 56.61526 100.00000 |
| 533 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 688 | 4.55980E 01 6.26661E 01 8.23081E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63844 20.92167 100.00000 2.93112 4.21299 |
| 540 | I128(0) | 25.00M | (2) 450 (2) 540 (2) 750 (2) 990 | 5.76576E 03 4.35614E 02 3.12000E 01 3.33216E 01 | 100.00000 7.55519 0.54113 0.57792 |
| 540 | PT199(0) | 30.00M | (2) 197 (2) 246 (2) 318 (2) 475 (2) 540 (2) 720 (2) 790 (2) 960 | 4.88498E 01 2.32483E 02 4.18535E 02 3.16567E 02 4.68234E 02 9.29995E 00 8.37706E 00 1.56182E 00 | 10.43278 49.65101 89.38595 67.60869 100.00000 1.98618 1.78907 0.33356 |
| 543 | SM153(0) | 47.00H | (2) 103 (2) 170 (2) 543 (2) 615 | 3.65013E 05 1.46160E 02 9.02070E 02 1.17450E 01 | 100.00000 0.04004 0.24713 0.00322 |
| 545 | MO101(0) | 14.60M | (2) 130 (2) 183 (2) 192 (2) 235 (2) 307 (2) 545 (2) 960 | 1.63238E 01 1.91840E 00 5.14738E 02 2.98356E 00 2.49143E 02 7.98660E 00 3.76992E 01 | 3.17129 0.37269 100.00000 0.57963 48.40191 1.55159 7.32396 |
| 548 | PR142(0) | 19.20H | (2) 1570 (3) 548 | 4.51536E 02 6.73440E 01 | 100.00000 14.91443 |
| 552 | W187(0) | 24.00H | (2) 134 (2) 430 (2) 532 (2) 619 (2) 626 (2) 774 (2) 866 | 2.11791E 04 7.52026E 03 2.36650E 03 1.52181E 03 9.42705E 03 7.60750E 02 3.92049E 02 | 100.00000 35.50785 11.17371 7.18542 44.51101 3.59198 1.85111 |
| 554 | BR82(0) | 35.70H | (2) 554 (2) 619 (2) 698 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (3) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 556 | IN114M(0) | 49.00D | (2) 192 (2) 536 (2) 722 (2) 1299 | 9.52646E 03 3.73464E 02 2.63290E 02 3.78360E 00 | 100.00000 3.92028 2.76377 0.03972 |
| 560 | RU103(0) | 40.00D | (2) 440 (2) 498 (2) 560 (2) 610 | 1.78200E 01 2.64190E 03 1.14307E 01 1.27449E 02 | 0.67452 100.00000 0.43267 4.82414 |
| 561 | AS76(1) | 26.50H | (2) 561 (2) 648 (2) 1210 (2) 1410 (2) 2060 (3) 1038 | 1.34829E 04 2.22218E 03 1.10090E 03 8.34720E 01 9.28493E 01 9.37728E 01 | 100.00000 16.48143 8.16514 0.61910 0.68864 0.69549 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|---|---|
| 563 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 801 (2) 1039 (2) 1168 (2) 1368 | 2.28150E 03 9.45851E 03 1.55982E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 8.94301E 02 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54139 0.88085 1.27123 |
| 563 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 633 (2) 709 (2) 720 (2) 1030 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 3.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 53.59226 100.00000 18.26952 24.14230 2.09839 1.16867 1.93778 1.84834 1.87807 1.25394 |
| 564 | SB122(0) | 2.80D | (2) 564 (2) 686 (2) 1140 (2) 1260 | 1.15474E 04 4.38313E 02 2.19240E 02 4.57800E 02 | 100.00000 3.79578 1.89962 3.96454 |
| 568 | CL38(1) | 37.50M | (2) 1570 (2) 2164 (3) 568 (3) 1142 | 1.34924E 02 9.62329E 01 2.07576E 01 1.22180E 02 | 100.00000 71.36063 15.38462 90.55418 |
| 569 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 801 (2) 1039 (2) 1168 (2) 1368 | 2.28150E 03 9.45851E 03 1.55982E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 8.94301E 02 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54139 0.88085 1.27123 |
| 573 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 834 (2) 1050 (2) 1595 (2) 1953 (2) 2203 (2) 2491 (2) 2503 (3) 573 (3) 937 (3) 1141 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17525E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01230E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 578 | LA140(0) | 40.20H | (2) 329 (2) 438 (2) 487 (2) 915 (2) 1600 (2) 2500 (2) 3578 (2) 1478 | 2.91762E 04 2.85314E 03 1.98768E 04 8.94344E 03 3.55360E 03 3.84912E 01 1.33650E 03 3.74800E 01 | 100.00000 9.77900 68.12650 30.65315 29.31700 0.13193 4.58078 0.29993 |
| 588 | HO166(0) | 27.30H | (2) 1280 (2) 1360 (2) 1530 (2) 1610 (2) 508 (3) 588 | 1.57992E 05 6.44906E 02 1.09477E 02 5.17493E 01 1.43022E 01 8.75556E 00 | 100.00000 0.40819 0.06929 0.03275 0.00905 0.00554 |
| 588 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 294 (2) 309 (2) 317 (2) 375 (2) 417 (2) 443 (2) 443 (2) 588 (2) 603 (2) 613 (2) 835 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33556E 04 5.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69391 5.73224 0.65702 41.82224 33.78755 100.00000 1.21006 1.11806 36.58709 1.79849 2.82450 5.37151 3.15032 0.11907 |
| 593 | EU154(0) | 16.30Y | (2) 123 (2) 248 (2) 393 (2) 694 (2) 706 (2) 735 (2) 759 (2) 875 (2) 998 (2) 1007 (2) 1277 | 2.04540E 06 5.42787E 05 5.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 598 | ZR97(0) | 17.00H | (2) 665 (2) 747 (2) 1350 (2) 1620 (2) 2200 (3) 598 (3) 1178 | 6.83405E 00 5.81960E 00 1.17600E 01 4.60992E 02 1.41120E 02 8.40840E 03 1.83456E 02 | 100.00000 85.15591 1.72079 0.67455 0.20650 0.12304 0.26844 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|---|---|
| 600 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 698 | 4.55980E 01 6.26661E 01 3.23091E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63844 20.92167 100.00000 2.93112 4.21299 |
| 601 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1505 (2) 1959 (2) 2203 (2) 2491 (2) 2503 (2) 573 (2) 937 (2) 1181 (2) 1469 (2) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 3.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 603 | SB124(0) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (2) 672 (2) 1068 | 3.92323E 03 5.66145E 03 5.31391E 03 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07188E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 605 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 801 (2) 1038 (2) 1163 (2) 1368 | 2.28150E 03 9.45851E 03 1.59827E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 8.94301E 03 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54189 0.88035 1.27123 |
| 605 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 236 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 605 | TI51(0) | 5.80M | (2) 323 (2) 605 (2) 928 | 1.96241E 02 1.05412E 00 1.85240E 01 | 100.00000 0.53715 9.43941 |
| 610 | RU103(0) | 40.00D | (2) 440 (2) 498 (2) 560 (2) 610 | 1.78200E 01 2.64190E 02 1.14307E 01 1.27449E 02 | 0.67452 100.00000 0.43267 4.82414 |
| 613 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 236 (2) 309 (2) 317 (2) 375 (2) 417 (2) 468 (2) 485 (2) 588 (2) 605 (2) 613 (2) 885 | 1.34086E 04 1.10781E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 0.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78849 2.82450 5.37151 3.15032 0.11907 |
| 615 | SM153(0) | 47.00H | (2) 103 (2) 170 (2) 543 (2) 615 | 3.65013E 05 1.46160E 02 9.02070E 02 1.17450E 01 | 100.00000 0.04004 0.24713 0.00322 |
| 616 | HF181(1) | 45.00D | (2) 133 (2) 136 (2) 137 (2) 346 (2) 432 (2) 616 | 3.33030E 04 4.59280E 03 1.39136E 03 3.46245E 03 1.25012E 04 2.01589E 03 | 100.00000 13.72096 4.17790 10.32683 37.53785 6.05318 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 619 | AC110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 835 (2) 937 (2) 1384 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 8.02907E 02 1.01771E 03 2.27690E 02 2.58579E 03 3.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 619 | BR82(0) | 35.90H | (2) 554 (2) 619 (2) 693 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (3) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 619 | W187(0) | 24.00H | (2) 134 (2) 480 (2) 552 (2) 619 (2) 626 (2) 774 (2) 866 | 2.11791E 04 7.52026E 03 2.36650E 03 1.52181E 03 9.42705E 03 7.60750E 02 3.92049E 02 | 100.00000 35.50785 11.17371 7.18542 44.51101 3.59198 1.85111 |
| 620 | RA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E-01 1.01035E-01 2.63710E-02 2.93763E-02 3.11351E-02 6.91242E-02 4.48689E-03 1.91347E-04 5.89182E-04 8.03722E-04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 620 | BR80(0) | 18.00M | (2) 620 | 3.40560E 03 | 100.00000 |
| 620 | IR124(0) | 19.00H | (2) 293 (2) 329 (2) 620 (2) 643 (2) 937 (2) 1150 (2) 1478 (3) 456 | 3.02112E 04 1.37374E 05 3.13470E 03 1.04762E 04 3.23500E 03 2.51100E 03 1.25058E 02 1.23462E 01 | 21.99200 100.00000 2.28188 7.62605 2.35490 1.82786 0.09103 0.00899 |
| 626 | W187(0) | 24.00H | (2) 134 (2) 480 (2) 552 (2) 619 (2) 626 (2) 774 (2) 866 | 2.11791E 04 7.52026E 03 2.36650E 03 1.52181E 03 9.42705E 03 7.60750E 02 3.92049E 02 | 100.00000 35.50785 11.17371 7.18542 44.51101 3.59198 1.85111 |
| 628 | GF75(0) | 1.33H | (2) 199 (2) 264 (2) 427 (2) 477 (2) 628 | 8.53721E 01 5.23286E 02 6.03936E 00 4.70934E 00 2.35856E 00 | 16.31461 100.00000 1.15412 0.89996 0.45072 |
| 630 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2509 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 631 | RE186(0) | 3.80D | (2) 123 (2) 137 (2) 631 (2) 768 | 8.52687E 03 8.79413E 04 7.38173E 01 3.37534E 01 | 9.69609 100.00000 0.08394 0.03838 |
| 632 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 8.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 18.26952 24.14230 8.09839 5.16867 3.93778 1.84834 1.87807 1.25894 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|--|
| 633 | RE182(0) | 17.00H | (2) 155 (2) 478 (2) 633 | 6.63768E 04 9.73728E 02 1.05084E 03 | 100.00000 1.46697 1.58314 |
| 637 | 1131(0) | 8.10D | (2) 294 (2) 364 (2) 637 (2) 722 | 4.97678E 01 5.23930E 02 2.47552E 01 6.29638E 00 | 9.49394 100.00000 4.72431 1.20176 |
| 640 | SN125M(0) | 9.50M | (2) 326 (2) 640 (2) 1070 (2) 1394 | 1.24505E 02 1.33947E-01 7.25274E-02 2.94974E-01 | 100.00000 0.10758 0.05825 0.23692 |
| 643 | 13124(0) | 19.00H | (2) 293 (2) 322 (2) 620 (2) 643 (2) 937 (2) 1150 (2) 1478 (3) 456 | 3.02112E 04 1.37374E 05 3.13470E 05 1.04762E 04 3.23500E 03 2.51100E 03 1.25058E 02 1.23462E 01 | 21.99200 100.00000 2.28188 7.62605 2.35490 1.82786 0.09103 0.00899 |
| 646 | SB124(0) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (3) 672 (3) 1068 | 3.92323E 03 3.66145E 02 5.31381E 02 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07188E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 648 | AS75(1) | 26.50H | (2) 561 (2) 648 (2) 1210 (2) 1410 (2) 2060 (3) 1038 | 1.34829E 04 2.22218E 03 1.10090E 03 8.34720E 01 9.28493E 01 9.37728E 01 | 100.00000 16.48143 8.16514 0.61910 0.68864 0.69549 |
| 657 | AS110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1334 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 8.02907E 02 1.01771E 03 2.27690E 02 2.58579E 03 3.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 665 | ZR97(0) | 17.00H | (2) 665 (2) 747 (2) 1350 (2) 1620 (2) 2200 (3) 598 (3) 1178 | 6.83405E 00 5.81960E 00 1.17600E-01 4.60992E-02 1.41120E-02 8.40840E-03 1.83456E-02 | 100.00000 85.15591 1.72079 0.67455 0.20650 0.12304 0.26844 |
| 668 | CE143(0) | 33.00H | (2) 232 (2) 294 (2) 351 (2) 473 (2) 668 (2) 722 | 7.17336E 01 4.38890E 02 3.43545E 00 2.46183E 01 2.77979E 01 2.51065E 02 | 16.34431 100.00000 1.92199 5.60922 6.33368 57.20459 |
| 672 | SB124(0) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (3) 672 (3) 1068 | 3.92323E 03 3.66145E 02 5.31381E 02 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07188E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 675 | AU193(0) | 2.69D | (2) 412 (2) 675 (2) 1089 | 4.14259E 05 2.03278E 03 2.61211E 02 | 100.00000 0.50277 0.06305 |
| 677 | AS110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1334 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 8.02907E 02 1.01771E 03 2.27690E 02 2.58579E 03 3.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 686 | SB122(0) | 2.80D | (2) 564 (2) 686 (2) 1140 (2) 1260 | 1.15474E 04 4.38313E 02 2.19240E 02 4.57800E 02 | 100.00000 3.79578 1.89862 3.96454 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|--|
| 688 | ND147(0) | 11.50D | (2) 121 (2) 277 (2) 321 (2) 412 (2) 441 (2) 533 (2) 600 (2) 688 | 4.55980E 01 6.26661E 01 8.23081E 01 3.79142E 00 3.00643E 01 1.43699E 02 4.21200E 00 6.05405E 00 | 31.73153 43.60918 57.27797 2.63844 20.92167 100.00000 2.93112 4.21299 |
| 694 | EU154(0) | 16.00Y | (2) 123 (2) 243 (2) 593 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 928 (2) 1007 (2) 1277 | 2.04540E 06 2.42737E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 698 | BR82(0) | 35.90H | (2) 554 (2) 619 (2) 699 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (2) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06523E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 705 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 883 (2) 937 (2) 1334 (2) 1504 (2) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 3.02907E 02 1.01771E 03 2.27690E 02 2.58579E 03 3.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29344 11.17220 5.34674 0.60407 |
| 706 | EU154(0) | 16.00Y | (2) 123 (2) 243 (2) 593 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 928 (2) 1007 (2) 1277 | 2.04540E 06 2.42737E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 709 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 369 (2) 413 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1083 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 2.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 3.42304E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 18.26952 24.14236 8.09839 5.16867 3.93778 1.84934 1.87907 1.25894 |
| 714 | SB124(0) | 60.00D | (2) 603 (2) 645 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (2) 672 (2) 1068 | 3.92323E 03 3.66145E 02 5.31381E 02 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07188E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 720 | PT199(0) | 30.00M | (2) 197 (2) 246 (2) 313 (2) 475 (2) 540 (2) 720 (2) 790 (2) 960 | 4.88498E 01 2.32483E 02 4.18535E 02 3.16567E 02 4.68234E 02 9.29995E 00 8.37706E 00 1.56182E 00 | 10.43278 49.65101 89.38595 67.60869 100.00000 1.98618 1.78907 0.33356 |
| 722 | CE143(0) | 33.00H | (2) 232 (2) 294 (2) 351 (2) 493 (2) 669 (2) 722 | 7.17336E 01 4.38990E 02 8.43545E 00 2.46183E 01 2.77979E 01 2.51065E 02 | 16.34431 100.00000 1.92199 5.60922 6.33368 57.20459 |
| 722 | IN114M(0) | 49.00D | (2) 192 (2) 556 (2) 722 (2) 1299 | 9.52646E 03 3.73464E 02 2.63290E 02 3.78360E 00 | 100.00000 3.92028 2.76377 0.03972 |
| 722 | I131(0) | 8.10D | (2) 284 (2) 364 (2) 637 (2) 722 | 4.97678E 01 5.23930E 02 2.47552E 01 6.29638E 00 | 9.49894 100.00000 4.72491 1.20176 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|--|
| 722 | ZR95(0) | 65.00D | (2) 722 (2) 754 | 2.67239E 01 2.54348E 01 | 100.00000 95.17611 |
| 723 | SB124(0) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2000 (3) 672 (3) 1068 | 3.92323E 03 3.66145E 02 5.31381E 02 1.82456E 03 1.00641E 02 1.22127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07188E 01 | 100.00000 2.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 725 | EU154(0) | 16.00Y | (2) 123 (2) 248 (2) 593 (2) 624 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (3) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.93771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 726 | RU105(0) | 4.50H | (2) 130 (2) 726 | 1.18560E 03 4.73274E 02 | 100.00000 39.91849 |
| 740 | MO99(0) | 66.00H | (2) 140 (2) 181 (2) 372 (2) 740 (2) 790 | 5.74725E 03 2.38885E 02 1.01591E 01 3.65522E 01 3.31487E 00 | 100.00000 4.15650 0.17677 0.63600 0.05768 |
| 747 | ZR97(0) | 17.00H | (2) 665 (2) 747 (2) 1350 (2) 1620 (2) 2200 (2) 599 (3) 1178 | 6.83405E 00 5.81960E 00 1.17600E -01 4.60392E -02 1.41120E -02 8.40840E -03 1.83456E -02 | 100.00000 85.15591 1.72079 0.67455 0.20650 0.12304 0.26844 |
| 750 | I128(0) | 25.00M | (2) 450 (2) 540 (2) 750 (2) 990 | 5.76576E 03 4.35614E 02 3.12000E 01 3.33216E 01 | 100.00000 7.55519 0.54113 0.57792 |
| 754 | ZR95(0) | 65.00D | (2) 722 (2) 754 | 2.67239E 01 2.54348E 01 | 100.00000 95.17611 |
| 758 | AL28(0) | 2.30M | (2) 1780 (3) 758 | 9.47520E 02 3.72240E 02 | 100.00000 39.28571 |
| 759 | EU154(0) | 16.00Y | (2) 123 (2) 248 (2) 593 (2) 624 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (3) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.93771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 764 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 7 (2) 705 (2) 764 (2) 815 (2) 895 (2) 937 (2) 1394 (2) 1504 (3) 432 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 9.02907E 02 1.01771E 03 2.27690E 02 2.58579E 05 8.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 765 | NB95(0) | 35.00D | (2) 765 | 5.10016E 01 | 100.00000 |
| 768 | RE186(0) | 3.80D | (2) 123 (2) 137 (2) 631 (2) 768 | 8.52687E 03 8.79413E 04 7.38173E 01 3.37534E 01 | 2.69609 100.00000 0.08394 0.03838 |
| 774 | W187(0) | 24.00H | (2) 134 (2) 480 (2) 552 (2) 619 (2) 626 (2) 774 (2) 866 | 2.11791E 04 7.52026E 03 2.36650E 03 1.52181E 03 9.42705E 03 7.60750E 02 3.92049E 02 | 100.00000 35.50785 11.17371 7.18542 44.51101 3.59198 1.85111 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|--|
| 777 | BR92(0) | 35.90H | (2) 554 (2) 619 (2) 699 (2) 777 (2) 823 (2) 1044 (2) 1317 (2) 1475 (3) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 780 | MO99(0) | 66.00H | (2) 140 (2) 181 (2) 372 (2) 740 (2) 780 | 5.74725E 03 2.38885E 02 1.01591E 01 3.65522E 01 3.31487E 00 | 100.00000 4.15650 0.17677 0.63600 0.05768 |
| 782 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 9.89491E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 784 | MY56(1) | 2.60H | (2) 845 (2) 1806 (2) 2131 (2) 2651 (2) 2976 (2) 784 (2) 1109 (2) 1629 (3) 1954 | 6.73388E 04 7.33960E 03 2.87468E 03 2.54607E 02 4.93261E 01 3.17871E 03 3.43576E 03 7.07683E 02 1.80343E 02 | 100.00000 10.89952 4.26899 0.37810 0.07399 4.72047 5.10219 1.05093 0.26856 |
| 790 | PT129(0) | 30.00M | (2) 127 (2) 246 (2) 313 (2) 475 (2) 540 (2) 720 (2) 790 (2) 960 | 4.88498E 01 2.32483E 02 4.19535E 02 2.16567E 02 4.68234E 02 9.29995E 00 3.37706E 00 1.56182E 00 | 10.43278 49.65101 89.38595 67.60869 100.00000 1.98618 1.78907 0.33356 |
| 796 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 901 (2) 1038 (2) 1168 (2) 1368 | 2.28150E 03 9.45851E 03 1.59827E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 8.94301E 02 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54189 0.88085 1.27123 |
| 801 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 801 (2) 1038 (2) 1168 (2) 1368 | 2.28150E 03 9.45851E 03 1.59827E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 8.94301E 02 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54189 0.88085 1.27123 |
| 815 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1384 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 8.02907E 02 1.01777E 03 2.27690E 02 2.58579E 03 8.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 815 | LA140(0) | 40.20H | (2) 329 (2) 438 (2) 487 (2) 815 (2) 1600 (2) 2500 (3) 578 (3) 1478 | 2.91762E 04 2.85314E 03 1.98768E 04 8.94344E 03 8.55360E 03 3.84912E 01 1.33650E 03 8.74800E 01 | 100.00000 9.77900 68.12650 30.65315 29.31700 0.13193 4.58078 0.29983 |
| 820 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E-01 1.01035E-01 2.63710E-02 2.93763E-02 3.11351E-02 6.91242E-02 4.48688E-03 1.91347E-04 5.89182E-04 8.03722E-04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 828 | BR82(0) | 35.90H | (2) 554 (2) 619 (2) 698 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (3) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 828 | RB88(0) | 17.80M | (2) 908 (2) 1320 (2) 1850 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (3) 828 (3) 1088 (3) 1653 (3) 1988 (3) 2218 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E -01 8.26485E -01 9.31651E -02 8.37187E -02 3.81398E -02 6.72307E 00 5.38756E -01 2.33393E 00 3.44794E -01 3.79037E -01 5.21914E -01 | 100.00000 5.69848 63.34544 2.24339 3.89361 0.43891 0.39440 0.17968 31.67272 2.53811 11.01833 1.62434 1.79566 2.45876 |
| 830 | CA47(0) | 4.80D | (2) 480 (2) 830 (2) 1290 | 9.27440E -03 3.86208E -03 2.93832E -02 | 28.22338 13.14384 100.00000 |
| 830 | CU66(0) | 5.10M | (2) 850 (2) 1040 | 5.63220E 00 1.98223E 02 | 2.84134 100.00000 |
| 834 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2508 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.63924 13.44043 5.90051 11.30252 |
| 837 | EU152M(0) | 9.20H | (2) 122 (2) 344 (2) 837 (2) 961 (2) 983 (2) 1327 (2) 1410 | 1.21636E 06 1.28396E 03 1.43627E 05 1.24085E 05 1.12253E 04 1.99255E 04 1.36009E 04 | 100.00000 10.55571 11.80788 10.20128 0.92286 1.63812 1.11816 |
| 843 | MG27(0) | 9.50M | (2) 172 (2) 843 (2) 1015 | 4.72282E 00 5.16499E 01 1.70807E 01 | 9.14390 100.00000 33.07019 |
| 845 | MN56(1) | 2.60H | (2) 845 (2) 1806 (2) 2131 (2) 2651 (2) 2976 (2) 784 (3) 1109 (3) 1629 (3) 1954 | 6.73388E 04 7.33960E 03 2.87468E 03 2.54607E 02 4.98261E 01 3.17871E 03 3.43576E 03 7.07683E 02 1.80843E 02 | 100.00000 10.89952 4.26899 0.37810 0.07399 4.72047 5.10219 1.05093 0.26856 |
| 866 | W187(0) | 24.00H | (2) 134 (2) 480 (2) 552 (2) 619 (2) 626 (2) 774 (2) 866 | 2.11791E 04 7.52026E 03 2.36650E 03 1.52181E 03 9.42705E 03 7.60750E 02 3.92049E 02 | 100.00000 35.50785 11.17371 7.18542 44.51101 3.59198 1.85111 |
| 872 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 733 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 9.89691E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 874 | NB94M(0) | 6.60M | (2) 874 | 3.24459E 00 | 100.00000 |
| 875 | EU154(0) | 16.00Y | (2) 123 (2) 243 (2) 503 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (2) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82927 1.85294 2.91498 2.62498 3.16388 6.01496 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 880 | TB160(0) | 73.00D | (2) 197 (2) 299 (2) 391 (2) 830 (2) 964 (2) 1130 (2) 1270 | 3.95756E 04 5.80032E 04 4.28947E 03 1.32106E 04 1.24858E 04 4.49230E 03 2.07360E 03 | 68.26448 100.00000 7.39523 22.77557 21.52538 7.74578 3.57498 |
| 885 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1384 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 8.02907E 02 1.01777E 03 2.27690E 02 2.58579E 03 8.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30332 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 885 | IR192(0) | 74.00D | (2) 201 (2) 206 (2) 233 (2) 296 (2) 309 (2) 317 (2) 375 (2) 417 (2) 463 (2) 435 (2) 532 (2) 605 (2) 613 (2) 835 | 1.34086E 04 1.10731E 05 1.26975E 04 8.08255E 05 7.49606E 05 1.93260E 06 2.33856E 04 2.16076E 04 7.07080E 05 3.45643E 04 5.45862E 04 1.03810E 05 6.08828E 04 2.30118E 03 | 3.69381 5.73224 0.65702 41.82224 38.78755 100.00000 1.21006 1.11806 36.58709 1.78349 2.82450 3.37151 3.15932 0.11907 |
| 885 | SC46(0) | 94.00D | (2) 835 (2) 1119 | 1.49040E 05 1.13022E 05 | 100.00000 75.83333 |
| 894 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2503 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1436 | 8.69219E 02 2.66830E 03 5.03411E 03 6.53842E 02 3.24360E 02 3.71329E 02 1.36782E 02 5.17595E 02 1.58522E 02 2.97037E 02 5.76497E 01 1.01230E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 19.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 908 | RR98(0) | 17.80M | (2) 908 (2) 1390 (2) 1850 (2) 2110 (2) 2630 (2) 3010 (2) 3240 (2) 4870 (3) 823 (3) 1088 (3) 1658 (3) 1983 (3) 2213 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E 01 3.26488E 01 9.31651E 02 8.37187E 02 3.81398E 02 6.72307E 00 5.38756E 01 2.33893E 00 3.44794E 01 3.79037E 01 5.21914E 01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17268 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |
| 920 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 493 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E 01 1.01035E 01 2.63710E 02 2.93763E 02 3.11351E 02 6.91242E 02 4.46688E 03 1.91347E 04 5.89182E 04 8.03722E 04 | 100.00000 43.93342 11.46830 12.77528 13.54014 30.06096 1.95127 0.08321 0.25623 0.34953 |
| 920 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16710E 01 1.73330E 01 1.10625E 01 3.42304E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 13.26952 24.14230 8.09839 3.16867 3.93778 1.84834 1.87807 1.25394 |
| 928 | TI51(0) | 5.80M | (2) 323 (2) 605 (2) 928 | 1.96241E 02 1.05412E 00 1.85240E 01 | 100.00000 0.53715 3.43941 |
| 937 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1384 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 8.02907E 02 1.01777E 03 2.27690E 02 2.58579E 03 8.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30332 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 937 | GA72(1) | 14.20H | (2) 601 (3) 630 (3) 834 (3) 894 (3) 1050 (2) 1525 (2) 1959 (3) 2203 (3) 2491 (3) 2508 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53342E 03 3.24360E 02 3.71829E 02 1.36792E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 3.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.69924 13.44043 5.90051 11.30252 |
| 937 | IR194(0) | 19.00H | (2) 293 (3) 329 (3) 620 (3) 643 (3) 937 (3) 1150 (3) 1478 (3) 456 | 3.02112E 04 1.37374E 05 3.13470E 03 1.04762E 04 3.23500E 03 2.51100E 03 1.25059E 02 1.23462E 01 | 21.99200 100.00000 2.28188 7.62605 2.35490 1.82786 0.09103 0.00899 |
| 950 | Y8177(0) | 1.90H | (2) 118 (3) 140 (3) 147 (3) 950 (2) 1090 (2) 1120 (2) 1240 | 5.66496E 01 3.77136E 01 8.33184E 02 3.50208E 00 1.52099E 01 1.98634E 00 1.16683E 01 | 6.75861 4.49944 100.00000 0.41782 1.81462 0.23698 1.39210 |
| 960 | MO101(0) | 14.60M | (2) 130 (3) 183 (3) 192 (3) 235 (3) 307 (2) 545 (2) 960 | 1.63238E 01 1.91840E 00 5.14738E 02 2.98356E 00 2.49143E 02 7.98660E 00 3.76992E 01 | 3.17129 0.37269 100.00000 0.57963 48.40191 1.55159 7.32396 |
| 960 | PT199(0) | 30.00M | (2) 197 (2) 246 (3) 318 (3) 475 (3) 540 (2) 720 (2) 790 (2) 960 | 4.88498E 01 2.32483E 02 4.18535E 02 3.16567E 02 4.68234E 02 9.29995E 00 8.37706E 00 1.56182E 00 | 10.43278 49.65101 89.38595 67.60869 100.00000 1.98618 1.78907 0.33356 |
| 961 | EU152M(0) | 9.20H | (2) 122 (2) 344 (2) 837 (2) 961 (2) 983 (2) 1327 (2) 1410 | 1.21636E 06 1.28396E 05 1.43627E 05 1.24085E 05 1.12253E 04 1.99255E 04 1.36009E 04 | 100.00000 10.55571 11.80788 10.20128 0.92286 1.63812 1.11316 |
| 964 | T8160(0) | 73.00D | (2) 197 (2) 299 (2) 391 (2) 830 (2) 964 (2) 1180 (2) 1270 | 3.95256E 04 5.80032E 04 4.28947E 03 1.32106E 04 1.24858E 04 4.49280E 03 2.07360E 03 | 68.26448 100.00000 7.39523 22.77557 21.52598 7.74578 3.57498 |
| 969 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 9.89691E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 970 | S8124(3) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (2) 672 (3) 1068 | 3.92323E 03 3.66145E 02 3.31381E 02 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07188E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 983 | EU152M(0) | 9.20H | (2) 122 (2) 344 (2) 837 (2) 961 (2) 983 (2) 1327 (2) 1410 | 1.21636E 06 1.28396E 05 1.43627E 05 1.24085E 05 1.12253E 04 1.99255E 04 1.36009E 04 | 100.00000 10.55571 11.80788 10.20128 0.92286 1.63812 1.11316 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 990 | I128(0) | 25.00M | (2) 450 (2) 540 (2) 750 (2) 990 | 5.76576E 03 4.35614E 02 3.12000E 01 3.33216E 01 | 100.00000 7.55519 0.51113 0.57792 |
| 998 | EU154(0) | 16.00Y | (2) 123 (2) 248 (2) 593 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (2) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 1007 | EU154(0) | 16.00Y | (2) 123 (2) 248 (2) 593 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (2) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 1015 | MG27(0) | 9.50M | (2) 172 (2) 843 (2) 1015 | 4.72282E 00 5.16499E 01 1.70807E 01 | 9.14390 100.00000 33.07019 |
| 1030 | BA131(0) | 11.60D | (2) 124 (2) 216 (2) 239 (2) 249 (2) 374 (2) 498 (2) 620 (2) 820 (2) 920 (2) 1030 | 2.29947E -01 1.01035E -01 2.63710E -02 2.93763E -02 3.11351E -02 6.91242E -02 4.48688E -03 1.91347E -04 5.89182E -04 8.03722E -04 | 100.00000 43.93842 11.46830 12.77528 13.54014 30.06026 1.95127 0.08321 0.25623 0.34953 |
| 1038 | AS76(1) | 26.50H | (2) 561 (2) 648 (2) 1210 (2) 1410 (2) 2060 (3) 1038 | 1.34829E 04 2.22218E 03 1.10090E 03 8.34720E 01 9.28493E 01 9.37728E 01 | 100.00000 16.48143 8.16514 0.61910 0.68864 0.69549 |
| 1038 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 801 (2) 1038 (2) 1168 (2) 1368 | 2.23150E 03 9.45851E 03 1.59827E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 8.94301E 02 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54189 0.88085 1.27123 |
| 1040 | CU66(0) | 5.10M | (2) 830 (2) 1040 | 5.63220E 00 1.98223E 02 | 2.84134 100.00000 |
| 1044 | BR82(0) | 35.90H | (2) 554 (2) 619 (2) 693 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (3) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 1050 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2508 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 1068 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1085 (2) 1274 (2) 1487 (2) 2090 (3) 465 (3) 1068 | 1.07135E 05 2.92425E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57653 14.62646 10.26663 1.51340 11.04283 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|--|
| 1068 | SR124(0) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (3) 672 (3) 1068 | 3.92323E 03 3.65145E 02 5.31331E 02 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07189E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 1070 | SN125M(0) | 9.50M | (2) 326 (2) 640 (2) 1070 (2) 1304 | 1.24505E 02 1.33947E -01 7.25274E -02 2.94974E -01 | 100.00000 0.10758 0.05325 0.23692 |
| 1079 | RB86(1) | 18.00D | (2) 1079 | 8.43136E 01 | 100.00000 |
| 1080 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 652 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.91023E 01 5.16719E 01 1.73330E 01 1.10625E 01 8.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 13.26952 24.14230 3.09339 5.16867 3.93778 1.84834 1.87807 1.25894 |
| 1085 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1035 (2) 1274 (2) 1487 (2) 2090 (3) 465 (3) 1068 | 1.07135E 05 2.92423E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57653 14.62646 10.26663 1.51340 11.04283 |
| 1088 | RB88(0) | 17.80M | (2) 908 (2) 1390 (2) 1950 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (3) 828 (3) 1083 (3) 1658 (3) 1988 (3) 2218 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E -01 8.26489E -01 9.31651E -02 8.37187E -02 3.81398E -02 6.72307E -00 5.33756E -01 2.33393E 00 3.44794E -01 3.79037E -01 5.21914E -01 | 100.00000 3.69848 63.34544 2.24839 3.89261 0.43891 0.39440 0.17968 3.67272 2.53311 11.01883 1.62434 1.78566 2.45876 |
| 1089 | AU198(0) | 2.69D | (2) 412 (2) 675 (2) 1089 | 4.14259E 05 2.03278E 03 2.61211E 02 | 100.00000 0.50277 0.06305 |
| 1090 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 795 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 9.89691E 05 7.23610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34433 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 1090 | YB177(0) | 1.90H | (2) 118 (2) 140 (2) 147 (2) 950 (2) 1090 (2) 1120 (2) 1240 | 5.66496E 01 3.77136E 01 3.38184E 02 3.50208E 00 1.52099E 01 1.98634E 00 1.16683E 01 | 6.75861 4.49944 100.00000 0.41782 1.81462 0.23698 1.39210 |
| 1098 | FE59(0) | 45.00D | (2) 145 (2) 191 (2) 1098 (2) 1289 | 1.90740E 00 4.09568E 00 7.51634E 00 4.65355E 00 | 25.37672 54.49029 100.00000 61.91240 |
| 1109 | MN56(1) | 2.60H | (2) 845 (2) 1806 (2) 2131 (2) 2651 (2) 2976 (2) 794 (2) 1109 (2) 1627 (3) 1954 | 6.73388E 04 7.33960E 03 2.87468E 03 2.54607E 02 4.98261E 01 3.17971E 03 3.45576E 03 7.07683E 02 1.80843E 02 | 100.00000 10.89952 4.26899 0.37810 0.07399 4.72047 5.10219 1.05093 0.26956 |
| 1114 | NI65(1) | 2.60H | (2) 363 (2) 1114 (2) 1482 (3) 460 | 9.81712E 00 7.46283E 00 8.40342E 00 8.47262E -01 | 100.00000 76.01847 85.59265 8.63045 |
| 1114 | ZN65(1) | 245.00D | (2) 511 (2) 1114 | 2.63741E 01 1.41076E 02 | 18.69501 100.00000 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|---|---|
| 1119 | SC46(0) | 84.00D | (2) 885 (2) 1119 | 1.49040E 05 1.13022E 05 | 100.00000 75.83333 |
| 1120 | YB177(0) | 1.90H | (2) 118 (2) 140 (2) 147 (2) 950 (2) 1090 (2) 1120 (2) 1240 | 5.66496E 01 3.77136E 01 8.38184E 02 3.50208E 00 1.52099E 01 1.98634E 00 1.16683E 01 | 6.75841 4.49944 100.00000 0.41782 1.81462 0.23698 1.39210 |
| 1122 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 1122 (2) 1139 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |
| 1140 | SB122(0) | 2.80D | (2) 564 (2) 686 (2) 1140 (2) 1260 | 1.15474E 04 4.38313E 02 2.19240E 02 4.57800E 02 | 100.00000 3.79578 1.89862 3.96454 |
| 1142 | CL38(1) | 37.50M | (2) 1590 (2) 2164 (3) 568 (3) 1142 | 1.34924E 02 9.62829E 01 2.07576E 01 1.22180E 02 | 100.00000 71.36063 15.38462 90.55418 |
| 1150 | IR194(0) | 19.00H | (2) 293 (2) 329 (2) 620 (2) 643 (2) 937 (2) 1150 (2) 1478 (3) 456 | 3.02112E 04 1.37374E 05 3.13470E 03 1.04762E 04 3.23500E 03 2.51100E 03 1.25058E 02 1.23462E 01 | 21.99200 100.00000 2.28188 7.62605 2.35490 1.82786 0.09103 0.00899 |
| 1168 | CS174(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 726 (2) 801 (2) 1038 (2) 1168 (2) 1368 | 2.28150E 03 9.45851E 03 1.59827E 04 1.01527E 05 6.40736E 04 6.37528E 03 5.50168E 02 8.94301E 02 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54189 0.83085 1.27123 |
| 1172 | CO60(0) | 5.25Y | (2) 1172 (2) 1332 | 1.30758E 05 1.12998E 05 | 100.00000 86.41765 |
| 1178 | ZR97(0) | 17.00H | (2) 665 (2) 747 (2) 1350 (2) 1620 (2) 2200 (3) 598 (3) 1178 | 6.83405E 00 5.91960E 00 1.17600E 01 4.60992E 02 1.41120E 02 8.40840E 03 1.83456E 02 | 100.00000 85.15591 1.72079 0.67455 0.20650 0.12304 0.26844 |
| 1180 | TR160(0) | 73.00D | (2) 197 (2) 299 (2) 391 (2) 880 (2) 964 (2) 1180 (2) 1270 | 3.95956E 04 5.80032E 04 4.28947E 03 1.32106E 04 1.24858E 04 4.49280E 03 2.07360E 03 | 68.26448 100.00000 7.39523 22.77557 21.52598 7.74578 3.57498 |
| 1181 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2508 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 1189 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 1122 (2) 1189 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|---|---|--|
| 1200 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 03 7.45056E 05 2.82184E 05 7.89691E 05 7.28610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 1210 | AS76(1) | 26.50H | (2) 561 (2) 643 (2) 1210 (2) 1410 (2) 2060 (3) 1033 | 1.34829E 04 2.22218E 03 1.10090E 03 3.34720E 01 9.28493E 01 9.37728E 01 | 100.00000 16.48143 3.16514 0.61910 0.68864 0.69549 |
| 1222 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 1155 (2) 1189 (2) 1222 (2) 1231 | 6.28425E 02 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |
| 1231 | TA182(0) | 115.00D | (2) 100 (2) 114 (2) 152 (2) 179 (2) 222 (2) 1122 (2) 1189 (2) 1222 (2) 1231 | 6.28425E 03 1.27153E 04 3.97511E 04 1.57662E 04 2.78169E 04 7.98781E 03 3.31338E 03 6.82214E 03 3.55305E 03 | 15.80900 31.98734 100.00000 39.66239 69.97763 20.09456 8.33531 17.16216 8.93824 |
| 1240 | YB177(0) | 1.70H | (2) 118 (2) 140 (2) 147 (2) 950 (2) 1090 (2) 1120 (2) 1240 | 5.66496E 01 3.77134E 01 2.33184E 02 3.50208E 00 1.52099E 01 1.98634E 00 1.16693E 01 | 6.75861 4.49944 100.00000 9.41782 1.81462 0.23698 1.39210 |
| 1260 | SB122(0) | 2.80D | (2) 564 (2) 686 (2) 1140 (2) 1260 | 1.15474E 04 4.38713E 02 2.19240E 02 4.57800E 02 | 100.00000 3.79578 1.89862 3.96454 |
| 1260 | SI31(0) | 2.60H | (2) 1260 | 1.64808E-02 | 100.00000 |
| 1270 | TR160(0) | 73.00D | (2) 197 (2) 229 (2) 321 (2) 820 (2) 964 (2) 1180 (2) 1270 | 3.95956E 04 5.80032E 04 4.28947E 03 1.32106E 04 1.24858E 04 4.49280E 03 2.07360E 03 | 68.26448 100.00000 7.39523 22.77557 21.52598 7.74578 3.57498 |
| 1274 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1095 (2) 1274 (2) 1487 (2) 2090 (2) 465 (3) 1063 | 1.07135E 05 2.92425E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57653 14.62646 10.26663 1.51340 11.04293 |
| 1277 | EU154(0) | 16.00Y | (2) 123 (2) 248 (2) 593 (2) 694 (2) 706 (2) 725 (2) 759 (2) 875 (2) 998 (2) 1007 (2) 1277 | 2.04540E 06 2.42787E 05 2.99426E 04 2.98771E 03 2.92219E 03 1.19246E 05 3.79002E 04 5.96232E 04 5.36915E 04 6.47141E 04 1.23030E 05 | 100.00000 11.86986 1.46390 0.14607 0.14287 5.82997 1.85294 2.91498 2.62498 3.16388 6.01496 |
| 1289 | FE59(0) | 45.00D | (2) 145 (2) 191 (2) 1098 (2) 1289 | 1.90740E 00 4.09568E 00 7.51634E 00 4.65355E 00 | 25.37672 54.49029 100.00000 61.91240 |
| 1290 | A41(0) | 1.80H | (2) 1290 | 2.52110E 03 | 100.00000 |
| 1290 | CA47(0) | 4.80D | (2) 480 (2) 830 (2) 1290 | 8.29440E-03 3.86208E-03 2.93832E-02 | 28.22838 13.14384 100.00000 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|--|--|
| 1299 | IN114M(0) | 49.00D | (2) 192 (2) 556 (2) 722 (2) 1299 | 9.52646E 03 3.73464E 02 2.63290E 02 3.78360E 00 | 100.00000 3.92028 2.75377 0.03972 |
| 1317 | BR92(0) | 35.90H | (2) 554 (2) 619 (2) 698 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (3) 453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 1322 | SB124(0) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (3) 672 (3) 1068 | 3.92323E 03 3.66145E 02 5.31381E 02 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39587E 02 3.07188E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 1327 | EU152M(0) | 9.20H | (2) 122 (2) 344 (2) 837 (2) 961 (2) 983 (2) 1327 (2) 1410 | 1.21636E 06 1.28396E 05 1.43627E 05 1.24085E 05 1.12253E 04 1.99255E 04 1.36009E 04 | 100.00000 10.55571 11.80788 10.20128 0.92286 1.63812 1.11816 |
| 1332 | CO60(0) | 5.25Y | (2) 1172 (2) 1332 | 1.30758E 05 1.12998E 05 | 100.00000 86.41765 |
| 1340 | CU64(1) | 12.90H | (2) 511 (2) 1340 | 1.07536E 04 4.12080E 01 | 100.00000 0.38320 |
| 1350 | ZR97(0) | 17.00H | (2) 665 (2) 747 (2) 1350 (2) 1620 (2) 2200 (3) 593 (3) 1178 | 6.83405E 00 5.81960E 00 1.17600E 01 4.60992E 02 1.41120E 02 8.40940E 03 1.83456E 02 | 100.00000 85.15591 1.72079 0.67455 0.20650 0.12304 0.26844 |
| 1360 | HO166(0) | 27.30H | (2) 80 (2) 1360 (2) 1530 (2) 1610 (2) 508 (3) 588 | 1.57992E 05 6.44906E 02 1.09477E 02 5.17493E 01 1.43022E 01 8.75556E 00 | 100.00000 0.40819 0.06929 0.03275 0.00905 0.00554 |
| 1368 | CS134(0) | 2.20Y | (2) 475 (2) 563 (2) 569 (2) 605 (2) 796 (2) 801 (2) 1038 (2) 1168 (2) 1368 | 2.28150E 03 9.45851E 03 1.59827E 04 1.01527E 05 6.40736E 04 6.37523E 03 5.50168E 02 8.94301E 02 1.29064E 03 | 2.24719 9.31628 15.74232 100.00000 63.11010 6.27941 0.54189 0.88085 1.27123 |
| 1368 | NA24(1) | 15.00H | (2) 1368 (2) 2754 (3) 1732 | 3.32898E 03 1.16508E 03 3.56221E 03 | 93.45261 32.70651 100.00000 |
| 1370 | GE77(0) | 12.00H | (2) 210 (2) 215 (2) 265 (2) 368 (2) 416 (2) 563 (2) 632 (2) 709 (2) 920 (2) 1080 (2) 1370 | 1.19156E 02 1.25405E 02 2.14030E 02 3.71023E 01 5.16719E 01 1.73330E 01 1.10625E 01 8.42804E 00 3.95600E 00 4.01964E 00 2.69451E 00 | 55.67227 58.59226 100.00000 18.26952 24.14230 8.09839 5.16867 3.93778 1.84834 1.87807 1.25894 |
| 1384 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 885 (2) 937 (2) 1384 (2) 1504 (3) 482 | 6.23318E 02 5.38017E 02 5.92330E 03 5.66828E 02 8.02907E 02 1.01771E 03 2.27690E 02 2.58579E 03 8.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 1390 | RB88(0) | 17.80M | (2) 908 (2) 1390 (2) 1850 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (2) 828 (2) 1088 (2) 1658 (2) 1938 (2) 2218 (2) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E -01 8.26485E -01 9.31651E -02 8.37187E -02 3.81398E -02 6.72307E 00 3.38756E -01 2.33893E 00 3.44794E -01 3.79037E -01 5.21914E -01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17968 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |
| 1394 | SN125M(0) | 9.50M | (2) 326 (2) 640 (2) 1070 (2) 1394 | 1.24505E 02 1.33947E -01 7.25274E -02 2.94974E -01 | 100.00000 0.10758 0.05825 0.23692 |
| 1410 | AS76(1) | 26.50H | (2) 561 (2) 648 (2) 1210 (2) 1410 (2) 2060 (2) 1038 | 1.34829E 04 2.22218E 03 1.10090E 03 8.34720E 01 9.23493E 01 9.37728E 01 | 100.00000 16.48143 8.16514 0.61910 0.68864 0.69549 |
| 1410 | BA139(1) | 1.42H | (2) 166 (2) 1410 | 1.60279E 03 7.50120E 01 | 100.00000 4.68010 |
| 1410 | EU152M(0) | 9.20H | (2) 122 (2) 344 (2) 837 (2) 961 (2) 923 (2) 1327 (2) 1410 | 1.21636E 06 1.28396E 05 1.43627E 05 1.24085E 05 1.22253E 04 1.99255E 04 1.36009E 04 | 100.00000 10.55571 11.80788 10.20128 0.92286 1.63812 1.11816 |
| 1420 | EU152(0) | 12.50Y | (2) 121 (2) 245 (2) 344 (2) 412 (2) 782 (2) 872 (2) 969 (2) 1090 (2) 1200 (2) 1420 | 2.31630E 07 4.94445E 06 6.45192E 06 1.86000E 05 7.45056E 05 2.82184E 05 2.89691E 05 7.23610E 05 2.56162E 05 9.38137E 05 | 100.00000 21.34633 27.85442 0.80300 3.21658 1.21825 4.27272 3.14558 1.10591 4.05016 |
| 1440 | V52(0) | 3.75M | (2) 1440 | 1.44690E 04 | 100.00000 |
| 1469 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1575 (2) 1959 (2) 2203 (2) 2491 (2) 2508 (2) 573 (2) 937 (2) 1181 (2) 1469 (2) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53342E 03 3.24360E 02 7.71829E 02 1.36782E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76197E 01 1.01930E 02 8.11010E 02 6.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 1475 | BR92(0) | 35.90H | (2) 554 (2) 619 (2) 698 (2) 777 (2) 828 (2) 1044 (2) 1317 (2) 1475 (2) 1453 | 7.97940E 03 4.50934E 03 2.31876E 03 6.09794E 03 1.91605E 03 1.53540E 03 1.06528E 03 5.94000E 02 5.77125E 01 | 100.00000 56.51224 29.05933 76.42106 24.01252 19.24205 13.35039 7.44417 0.72327 |
| 1478 | IR194(0) | 19.00H | (2) 293 (2) 329 (2) 620 (2) 643 (2) 937 (2) 1150 (2) 1478 (2) 1456 | 3.02112E 04 1.37374E 05 3.13470E 03 1.04762E 04 3.23500E 03 2.51100E 03 1.25058E 02 1.23462E 01 | 21.99200 100.00000 2.28188 7.62605 2.35490 1.82786 0.09103 0.00899 |
| 1478 | LA140(0) | 40.20H | (2) 329 (2) 433 (2) 487 (2) 815 (2) 1600 (2) 2500 (2) 578 (2) 1478 | 2.91762E 04 2.85314E 03 1.98768E 04 8.94344E 03 8.55360E 03 3.84912E 01 1.33650E 03 8.74800E 01 | 100.00000 9.77900 68.12650 30.65315 29.31700 0.13193 4.58078 0.29983 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 1482 | NI65(1) | 2.60H | (2) 368 (2) 1114 (2) 1482 (3) 460 | 9.81712E 00 7.46283E 00 8.40342E 00 8.47262E 01 | 100.00000 76.01847 85.59965 8.63045 |
| 1486 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2508 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36732E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 1487 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1085 (2) 1274 (2) 1487 (2) 2090 (3) 465 (3) 1063 | 1.07135E 05 2.92425E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57653 14.62646 10.26663 1.51340 11.04283 |
| 1504 | AG110M(1) | 260.00D | (2) 446 (2) 619 (2) 657 (2) 677 (2) 705 (2) 764 (2) 815 (2) 835 (2) 937 (2) 1384 (2) 1504 (3) 432 | 6.23318E 02 5.38017E 02 4.92330E 03 5.66828E 02 3.02907E 02 1.01777E 03 2.27690E 02 2.58579E 03 3.02420E 02 5.50040E 02 2.62940E 02 2.97402E 01 | 12.66058 10.92799 100.00000 11.51318 16.30832 20.67140 4.62475 52.52162 16.29844 11.17220 5.34074 0.60407 |
| 1530 | HO166(0) | 27.30H | (2) 80 (2) 1360 (2) 1530 (2) 1610 (3) 508 (3) 588 | 1.57992E 05 6.44906E 02 1.09477E 02 5.17493E 01 1.43022E 01 8.75556E 00 | 100.00000 0.40819 0.06929 0.03275 0.00905 0.00554 |
| 1530 | K42(0) | 12.50H | (2) 1530 (3) 598 | 6.36552E 01 8.31600E 00 | 100.00000 13.06413 |
| 1570 | PR142(0) | 19.20H | (2) 1570 (3) 549 | 4.51536E 02 6.73440E 01 | 100.00000 14.91443 |
| 1590 | CL78(1) | 37.50M | (2) 1590 (2) 2164 (3) 568 (3) 1142 | 1.34924E 02 2.62829E 01 2.07576E 01 1.22180E 02 | 100.00000 71.36063 15.38462 90.55418 |
| 1595 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2508 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36732E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 1600 | LA140(0) | 40.20H | (2) 329 (2) 438 (2) 487 (2) 815 (2) 1600 (2) 2500 (3) 573 (3) 1473 | 2.91762E 04 2.85314E 03 1.98768E 04 8.94344E 03 8.55360E 03 3.84912E 01 1.33650E 03 8.74800E 01 | 100.00000 9.77900 68.12650 30.65315 29.31700 0.13193 4.58078 0.29983 |
| 1610 | HO166(0) | 27.30H | (2) 80 (2) 1360 (2) 1530 (2) 1610 (3) 508 (3) 588 | 1.57992E 05 6.44906E 02 1.09477E 02 5.17493E 01 1.43022E 01 8.75556E 00 | 100.00000 0.40819 0.06929 0.03275 0.00905 0.00554 |
| 1620 | ZR97(0) | 17.00H | (2) 665 (2) 747 (2) 1350 (2) 1620 (2) 2200 (3) 598 (3) 1178 | 6.83405E 00 5.81960E 00 1.17600E 01 4.60992E 02 1.41120E 02 8.40840E 03 1.83456E 02 | 100.00000 85.15591 1.72079 0.67455 0.20650 0.12304 0.26844 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|-----------------|----------------------|-----------------------|
| 1629 | MN56(1) | 2.60H | (2) 845 | 6.73388E 04 | 100.00000 |
| | | | (2) 1806 | 7.33960E 03 | 10.89952 |
| | | | (2) 2131 | 2.87468E 03 | 4.26899 |
| | | | (2) 2651 | 2.54607E 02 | 0.37810 |
| | | | (2) 2976 | 4.98261E 01 | 0.07399 |
| | | | (2) 784 | 3.17871E 03 | 4.72047 |
| | | | (2) 1109 | 3.43576E 03 | 5.10219 |
| | | | (2) 1629 | 7.07683E 02 | 1.05093 |
| 1658 | RB88(0) | 17.80M | (3) 1954 | 1.80843E 02 | 0.26856 |
| | | | (2) 908 | 2.12267E 01 | 100.00000 |
| | | | (2) 1390 | 1.20960E 00 | 5.69848 |
| | | | (2) 1850 | 1.34461E 01 | 63.34544 |
| | | | (2) 2110 | 4.77259E -01 | 2.24839 |
| | | | (2) 2680 | 8.26485E -01 | 3.89361 |
| | | | (2) 3010 | 9.31651E -02 | 0.43891 |
| | | | (2) 3240 | 8.37187E -02 | 0.39440 |
| 1694 | SB124(0) | 60.00D | (2) 4870 | 3.81398E -02 | 0.17968 |
| | | | (3) 828 | 6.72307E 00 | 31.67272 |
| | | | (3) 1088 | 5.38756E -01 | 2.53811 |
| | | | (3) 1658 | 2.33893E 00 | 11.01883 |
| | | | (3) 1988 | 3.44794E -01 | 1.62434 |
| | | | (3) 2213 | 3.79037E -01 | 1.78566 |
| | | | (3) 3848 | 5.21914E -01 | 2.45876 |
| 1732 | NA24(1) | 15.00H | (2) 603 | 3.92323E 03 | 100.00000 |
| | | | (2) 646 | 3.66145E 02 | 9.33275 |
| | | | (2) 714 | 5.31381E 02 | 13.54447 |
| | | | (2) 723 | 1.82456E 03 | 46.50650 |
| | | | (2) 970 | 1.00641E 02 | 2.56525 |
| | | | (2) 1322 | 1.29127E 02 | 3.29135 |
| | | | (2) 1694 | 5.15137E 02 | 13.13043 |
| | | | (2) 2090 | 2.85596E 01 | 0.72796 |
| 1780 | AL28(0) | 2.30M | (3) 672 | 1.39587E 02 | 3.55797 |
| | | | (3) 1068 | 3.07188E 01 | 0.78300 |
| | | | (2) 1369 | 3.32898E 03 | 93.45261 |
| 1806 | MN56(1) | 2.60H | (2) 2754 | 1.16508E 03 | 32.70651 |
| | | | (3) 1732 | 3.56221E 03 | 100.00000 |
| | | | (2) 1780 | 9.47520E 02 | 100.00000 |
| 1850 | RB88(0) | 17.80M | (3) 753 | 3.72240E 02 | 39.28571 |
| | | | (2) 845 | 6.73388E 04 | 100.00000 |
| | | | (2) 1806 | 7.33960E 03 | 10.89952 |
| | | | (2) 2131 | 2.87468E 03 | 4.26899 |
| | | | (2) 2651 | 2.54607E 02 | 0.37810 |
| | | | (2) 2976 | 4.98261E 01 | 0.07399 |
| | | | (2) 784 | 3.17871E 03 | 4.72047 |
| | | | (2) 1109 | 3.43576E 03 | 5.10219 |
| 1954 | MN56(1) | 2.60H | (2) 1629 | 7.07683E 02 | 1.05093 |
| | | | (3) 1954 | 1.80843E 02 | 0.26856 |
| | | | (2) 908 | 2.12267E 01 | 100.00000 |
| | | | (2) 1390 | 1.20960E 00 | 5.69848 |
| | | | (2) 1850 | 1.34461E 01 | 63.34544 |
| | | | (2) 2110 | 4.77259E -01 | 2.24839 |
| | | | (2) 2680 | 8.26485E -01 | 3.89361 |
| | | | (2) 3010 | 9.31651E -02 | 0.43891 |
| 1959 | GA72(1) | 14.20H | (2) 3240 | 8.37187E -02 | 0.39440 |
| | | | (2) 4870 | 3.81398E -02 | 0.17968 |
| | | | (3) 828 | 6.72307E 00 | 31.67272 |
| | | | (3) 1088 | 5.38756E -01 | 2.53811 |
| | | | (3) 1658 | 2.33893E 00 | 11.01883 |
| | | | (3) 1988 | 3.44794E -01 | 1.62434 |
| | | | (3) 2218 | 3.79037E -01 | 1.78566 |
| | | | (3) 3848 | 5.21914E -01 | 2.45876 |
| 1988 | RB88(0) | 17.80M | (2) 845 | 6.73388E 04 | 100.00000 |
| | | | (2) 1806 | 7.33960E 03 | 10.89952 |
| | | | (2) 2131 | 2.87468E 03 | 4.26899 |
| | | | (2) 2651 | 2.54607E 02 | 0.37810 |
| | | | (2) 2976 | 4.98261E 01 | 0.07399 |
| | | | (2) 784 | 3.17871E 03 | 4.72047 |
| | | | (2) 1109 | 3.43576E 03 | 5.10219 |
| | | | (2) 1629 | 7.07683E 02 | 1.05093 |
| 1988 | RB88(0) | 17.80M | (3) 1954 | 1.80843E 02 | 0.26856 |
| | | | (2) 908 | 2.12267E 01 | 100.00000 |
| | | | (2) 1390 | 1.20960E 00 | 5.69848 |
| | | | (2) 1850 | 1.34461E 01 | 63.34544 |
| | | | (2) 2110 | 4.77259E -01 | 2.24839 |
| | | | (2) 2680 | 8.26485E -01 | 3.89361 |
| | | | (2) 3010 | 9.31651E -02 | 0.43891 |
| | | | (2) 3240 | 8.37187E -02 | 0.39440 |
| 1988 | RB88(0) | 17.80M | (2) 4870 | 3.81398E -02 | 0.17968 |
| | | | (3) 828 | 6.72307E 00 | 31.67272 |
| | | | (3) 1088 | 5.38756E -01 | 2.53811 |
| | | | (3) 1658 | 2.33893E 00 | 11.01883 |
| | | | (3) 1988 | 3.44794E -01 | 1.62434 |
| | | | (3) 2218 | 3.79037E -01 | 1.78566 |
| | | | (3) 3848 | 5.21914E -01 | 2.45876 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|-----------|-----------|--|---|---|
| 2060 | AS76(1) | 26.50H | (2) 561 (2) 648 (2) 1210 (2) 1410 (2) 2060 (3) 1038 | 1.34829E 04 2.22218E 03 1.10090E 03 8.34720E 01 9.28493E 01 9.37728E 01 | 100.00000 16.48143 8.16514 0.61910 0.68864 0.69549 |
| 2078 | CA49(0) | 8.80M | (2) 3100 (2) 4050 (2) 4680 (3) 2078 (3) 3028 (3) 3659 | 2.45106E 00 1.79712E -01 7.64640E -03 9.85230E 00 1.41336E 00 9.26640E -02 | 24.87805 1.82406 0.07761 100.00000 14.34548 0.94053 |
| 2078 | S37(0) | 5.04M | (2) 3100 (3) 2078 | 3.71790E -02 1.49445E -01 | 24.87805 100.00000 |
| 2090 | IN116M(0) | 54.00M | (2) 137 (2) 406 (2) 1035 (2) 1274 (2) 1487 (2) 2090 (2) 4653 (3) 1068 | 1.07135E 05 2.92425E 05 1.65658E 05 1.88838E 05 4.27715E 04 3.00222E 04 4.42555E 03 3.22920E 04 | 36.63674 100.00000 56.64970 64.57653 14.62646 10.26663 1.51340 11.04283 |
| 2090 | SB124(0) | 60.00D | (2) 603 (2) 646 (2) 714 (2) 723 (2) 970 (2) 1322 (2) 1694 (2) 2090 (3) 672 (3) 1068 | 3.92323E 03 3.66145E 02 5.31381E 02 1.82456E 03 1.00641E 02 1.29127E 02 5.15137E 02 2.85596E 01 1.39537E 02 3.07188E 01 | 100.00000 9.33275 13.54447 46.50650 2.56525 3.29135 13.13043 0.72796 3.55797 0.78300 |
| 2110 | RR88(0) | 17.80M | (2) 908 (2) 1390 (2) 1850 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (3) 828 (3) 1088 (3) 1658 (3) 1988 (3) 2218 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E -01 8.26485E -01 9.31651E -02 8.37187E -02 3.81398E -02 6.72307E 00 5.38756E -01 2.33893E 00 3.44794E -01 3.79037E -01 5.21914E -01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17968 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |
| 2131 | MN56(1) | 2.60H | (2) 845 (2) 1806 (2) 2131 (2) 2651 (2) 2976 (3) 784 (3) 1109 (3) 1629 (3) 1954 | 6.73388E 04 7.33960E 03 2.87468E 03 2.54607E 02 4.98261E 01 3.17871E 03 3.43576E 03 7.07683E 02 1.80843E 02 | 100.00000 10.89952 4.26899 0.37310 0.07399 4.72047 5.10219 1.05093 0.26856 |
| 2164 | CL38(1) | 37.50M | (2) 1590 (2) 2164 (3) 568 (3) 1142 | 1.34924E 02 9.62929E 01 2.07576E 01 1.22180E 02 | 100.00000 71.36063 15.38462 90.55418 |
| 2200 | ZR97(0) | 17.00H | (2) 665 (2) 747 (2) 1350 (2) 1620 (2) 2200 (2) 598 (3) 1178 | 6.83405E 00 5.81960E 00 1.17600E -01 4.60992E -02 1.41120E -02 8.40840E -03 1.83456E -02 | 100.00000 85.15591 1.72079 0.67455 0.20650 0.12304 0.26844 |
| 2203 | CA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1595 (2) 1959 (2) 2203 (2) 2491 (2) 2508 (3) 573 (3) 937 (3) 1181 (3) 1469 (3) 1486 | 8.69219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58529E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 5.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 6.16212 2.26681 10.23507 2.62722 4.92345 0.95540 1.68924 13.44043 5.90051 11.30252 |
| 2218 | RR88(0) | 17.80M | (2) 908 (2) 1390 (2) 1850 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (3) 828 (3) 1088 (3) 1658 (3) 1988 (3) 2218 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E -01 8.26485E -01 9.31651E -02 8.37187E -02 3.81398E -02 6.72307E 00 5.38756E -01 2.33893E 00 3.44794E -01 3.79037E -01 5.21914E -01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17968 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|----------|-----------|--|---|---|
| 2491 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1525 (2) 1950 (2) 2203 (2) 2471 (2) 3503 (2) 573 (2) 937 (2) 1181 (2) 1469 (3) 1436 | 8.62219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58522E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 8.16212 2.26681 10.23507 2.62722 4.92345 0.95540 6.68924 13.44043 5.90051 11.30252 |
| 2500 | LA140(0) | 40.20H | (2) 329 (2) 438 (2) 467 (2) 815 (2) 1600 (2) 2500 (3) 578 (3) 1478 | 2.91762E 04 3.85314E 03 1.93768E 04 8.94304E 03 8.55360E 03 3.84912E 01 1.33650E 03 8.74800E 01 | 100.00000 9.77900 68.12650 38.65715 29.31700 0.13123 4.59078 0.29993 |
| 2508 | GA72(1) | 14.20H | (2) 601 (2) 630 (2) 834 (2) 894 (2) 1050 (2) 1525 (2) 1950 (2) 2203 (2) 2471 (2) 3503 (2) 573 (2) 937 (2) 1181 (2) 1469 (3) 1436 | 8.62219E 02 2.66830E 03 6.03411E 03 6.53842E 02 3.24360E 02 3.71829E 02 1.36782E 02 6.17595E 02 1.58522E 02 2.97087E 02 5.76497E 01 1.01930E 02 8.11010E 02 3.56044E 02 6.82006E 02 | 14.40509 44.22030 100.00000 10.83576 5.37544 8.16212 2.26681 10.23507 2.62722 4.92345 0.95540 6.68924 13.44043 5.90051 11.30252 |
| 2651 | MN56(1) | 2.60H | (2) 845 (2) 1806 (2) 2131 (2) 2651 (2) 2776 (2) 734 (3) 1109 (3) 1629 (3) 1754 | 6.73388E 04 7.33960E 03 2.87468E 03 2.54607E 02 4.98261E 01 3.17871E 03 3.43576E 03 7.07683E 02 1.80843E 02 | 100.00000 10.89252 4.26899 0.37810 0.07399 4.72047 5.10219 1.05093 0.26856 |
| 2680 | RB38(0) | 17.80M | (2) 903 (2) 1320 (2) 1850 (2) 2110 (2) 2630 (2) 3010 (2) 3240 (2) 4870 (2) 823 (2) 1033 (3) 1658 (3) 1953 (3) 2213 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E -01 8.26485E -01 9.31651E -02 8.37187E -02 3.81398E -02 6.72307E 00 5.38756E -01 2.33823E 00 3.44794E -01 3.79037E -01 5.21914E -01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17268 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |
| 2754 | NA24(1) | 15.00H | (2) 1368 (2) 2754 (3) 1732 | 3.32898E 03 1.16508E 03 3.56221E 03 | 93.45261 32.70651 100.00000 |
| 2976 | MN56(1) | 2.60H | (2) 845 (2) 1806 (2) 2131 (2) 2651 (2) 2776 (2) 734 (3) 1109 (3) 1629 (3) 1754 | 6.73388E 04 7.33960E 03 2.87468E 03 2.54607E 02 4.98261E 01 3.17871E 03 3.43576E 03 7.07683E 02 1.80843E 02 | 100.00000 10.89952 4.26899 0.37810 0.07399 4.72047 5.10219 1.05093 0.26856 |
| 3010 | RB38(0) | 17.80M | (2) 903 (2) 1320 (2) 1850 (2) 2110 (2) 2630 (2) 3010 (2) 3240 (2) 4870 (2) 823 (2) 1033 (3) 1658 (3) 1953 (3) 2213 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E 01 4.77259E -01 8.26485E -01 9.31651E -02 8.37187E -02 3.81398E -02 6.72307E 00 5.38756E -01 2.33823E 00 3.44794E -01 3.79037E -01 5.21914E -01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17268 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |
| 3028 | CA49(0) | 8.80M | (2) 3100 (2) 4030 (2) 4630 (3) 2078 (3) 3028 (3) 3659 | 2.45106E 00 1.79712E -01 7.64640E -03 9.85230E 00 1.41336E 00 9.26640E -02 | 24.87805 1.82406 0.07761 100.00000 14.34548 0.94053 |

| ENERGY KEV | ISOTOPE | HALF LIFE | ENERGIES KEV | SPECIFIC ACTIVITY | RELATIVE ABUNDANCE |
|---------------|---------|-----------|--|--|---|
| 3100 | CA49(0) | 8.80M | (2) 3100 (2) 4050 (2) 4680 (3) 2078 (3) 3028 (3) 3658 | 2.45106E 00 1.79712E-01 7.64640E-03 9.85230E 00 1.41336E 00 9.26640E-02 | 24.87805 1.82406 0.07761 100.00000 14.34548 0.94053 |
| 3100 | S37(0) | 5.04M | (2) 3100 (3) 2078 | 3.71790E-02 1.49445E-01 | 24.87805 100.00000 |
| 3240 | RB88(3) | 17.80M | (2) 908 (2) 1390 (2) 1850 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (3) 828 (3) 1088 (3) 1658 (3) 1988 (3) 2218 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E-01 4.77259E-01 8.26485E-01 9.31651E-02 8.37187E-02 3.81398E-02 6.72307E 00 5.38756E-01 2.33893E 00 3.44794E-01 3.79037E-01 5.21914E-01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17968 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |
| 3658 | CA49(0) | 8.80M | (2) 3100 (2) 4050 (2) 4680 (3) 2078 (3) 3028 (3) 3658 | 2.45106E 00 1.79712E-01 7.64640E-03 9.85230E 00 1.41336E 00 9.26640E-02 | 24.87805 1.82406 0.07761 100.00000 14.34548 0.94053 |
| 3848 | RB88(0) | 17.80M | (2) 908 (2) 1390 (2) 1850 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (3) 828 (3) 1088 (3) 1658 (3) 1988 (3) 2218 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E-01 4.77259E-01 8.26485E-01 9.31651E-02 8.37187E-02 3.81398E-02 6.72307E 00 5.38756E-01 2.33893E 00 3.44794E-01 3.79037E-01 5.21914E-01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17968 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |
| 4050 | CA49(0) | 8.80M | (2) 3100 (2) 4050 (2) 4680 (3) 2078 (3) 3028 (3) 3658 | 2.45106E 00 1.79712E-01 7.64640E-03 9.85230E 00 1.41336E 00 9.26640E-02 | 24.87805 1.82406 0.07761 100.00000 14.34548 0.94053 |
| 4680 | CA49(0) | 8.80M | (2) 3100 (2) 4050 (2) 4680 (3) 2078 (3) 3028 (3) 3658 | 2.45106E 00 1.79712E-01 7.64640E-03 9.85230E 00 1.41336E 00 9.26640E-02 | 24.87805 1.82406 0.07761 100.00000 14.34548 0.94053 |
| 4870 | RB88(0) | 17.80M | (2) 908 (2) 1390 (2) 1850 (2) 2110 (2) 2680 (2) 3010 (2) 3240 (2) 4870 (3) 828 (3) 1088 (3) 1658 (3) 1988 (3) 2218 (3) 3848 | 2.12267E 01 1.20960E 00 1.34461E-01 4.77259E-01 8.26485E-01 9.31651E-02 8.37187E-02 3.81398E-02 6.72307E 00 5.38756E-01 2.33893E 00 3.44794E-01 3.79037E-01 5.21914E-01 | 100.00000 5.69848 63.34544 2.24839 3.89361 0.43891 0.39440 0.17968 31.67272 2.53811 11.01883 1.62434 1.78566 2.45876 |

(0) THEORETICAL VALUES OF ABUNDANCES
 (1) EXPERIMENTAL VALUES OF ABUNDANCES
 (2) PHOTOPEAKS
 (3) DOUBLE ESCAPE PEAKS

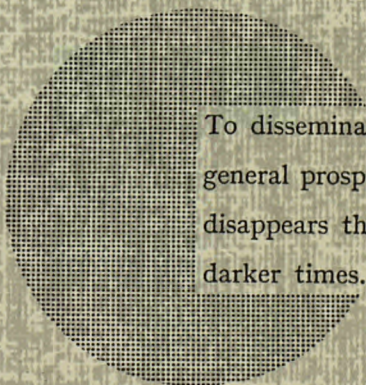
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Alfred Nobel

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